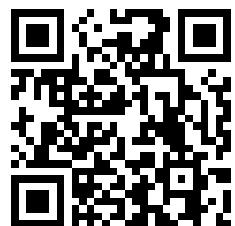

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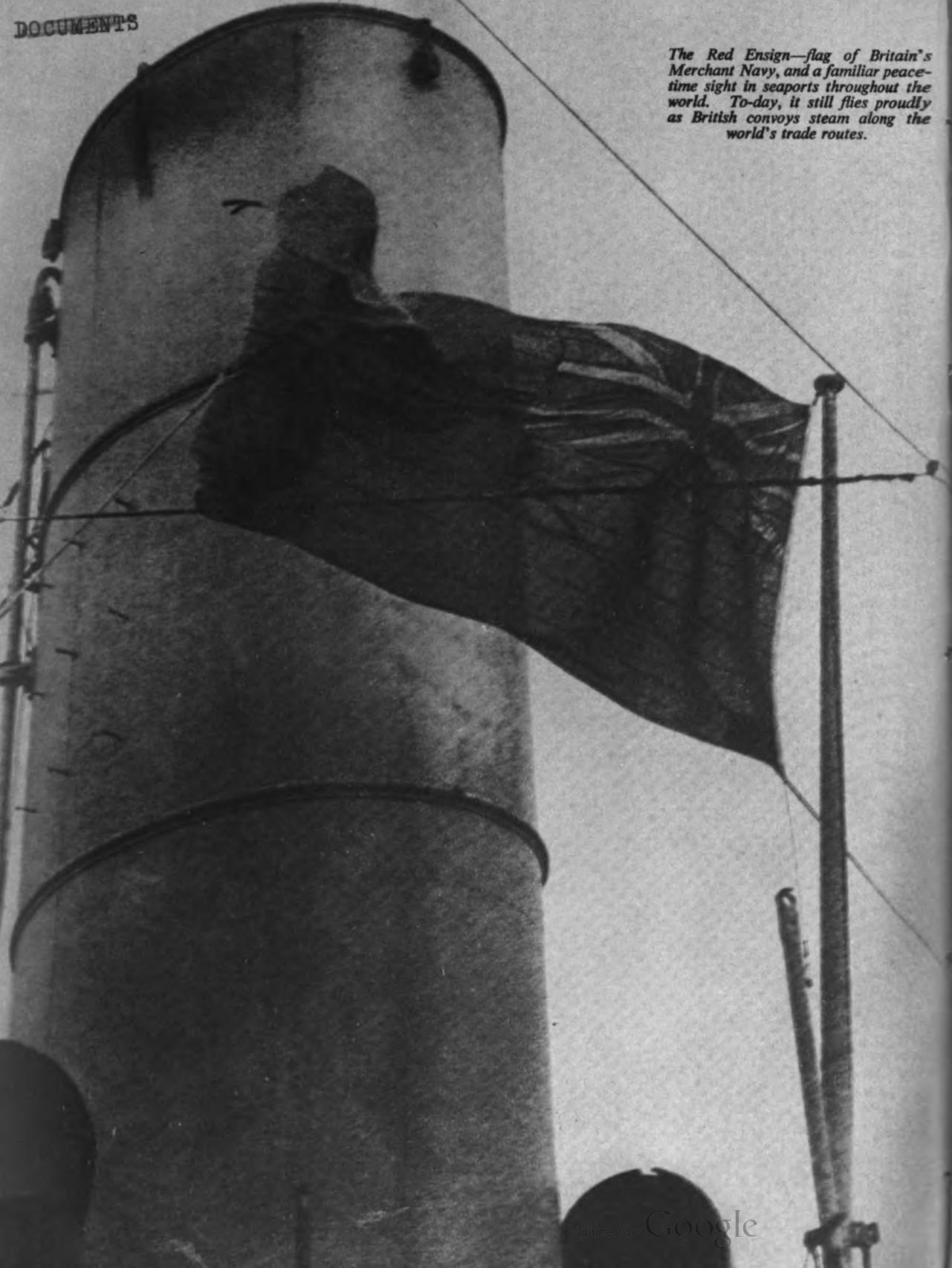
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Volume
No. 3

17



The Red Ensign—flag of Britain's Merchant Navy, and a familiar peace-time sight in seaports throughout the world. To-day, it still flies proudly as British convoys steam along the world's trade routes.





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LIFELINE OF DEMOCRACY

Sea-power won the last war for Britain and her Allies. Germany knew this, and concentrated, as she armed for a new war, upon building up her naval strength. But this was not enough. To-day the United Nations are defeating their enemies, both at sea and upon the far-flung fronts which sea-power alone can maintain and control. Taranto, Matapan, the Battle of the River Plate—these names will make naval history. But Germany and her satellites are being beaten, not by warships alone but by ships which were never intended or designed for exposure to human violence ; not by spectacular naval victories, but

by the Merchant Navy's steadiness and determination in carrying out the task which has earned for it the title "Lifeline of Democracy."

This title is something more than a piece of well-deserved praise. It states a hard and ever-present fact. If Britain's Merchant Navy ever faltered in the task of bringing home food and supplies, the island fortress which has for so long withstood all threats of invasion from without would fall from within—starved into submission in a few months. And attack, as well as defence, depends upon the maintenance of seaborne supplies. Not an aircraft

The "Queen Mary," holder of the coveted "Blue Riband" of the Atlantic, steams into New York harbour after a record-breaking run.



could fly, not a bomb could be dropped, not a shot could be fired in the cause of world freedom, were it not for the Merchant Navy. British aircraft are dependent for every drop of petrol they consume on the tankers which arrive regularly to fill the storage tanks. Daily the ships arrive, bringing food, metals, chemicals and other vital raw materials with which the United Nations are building up, in Britain, a forward base for the invasion of Nazi-occupied Europe. And the convoys leave Britain in their hundreds, carrying troops, supplies and equipment to the far-flung battlefields on which Britain and her Allies are attacking the enemy.

Winston Churchill, Britain's Prime Minister, has said that there are never fewer than 2,000 ships from the United Kingdom afloat on the high seas. Every minute of the day, between 300 and 400

of them are sailing through danger areas—wide tracts of ocean infested by German submarines, sharks of war, or open to Axis bombers which range the skies seeking victims.

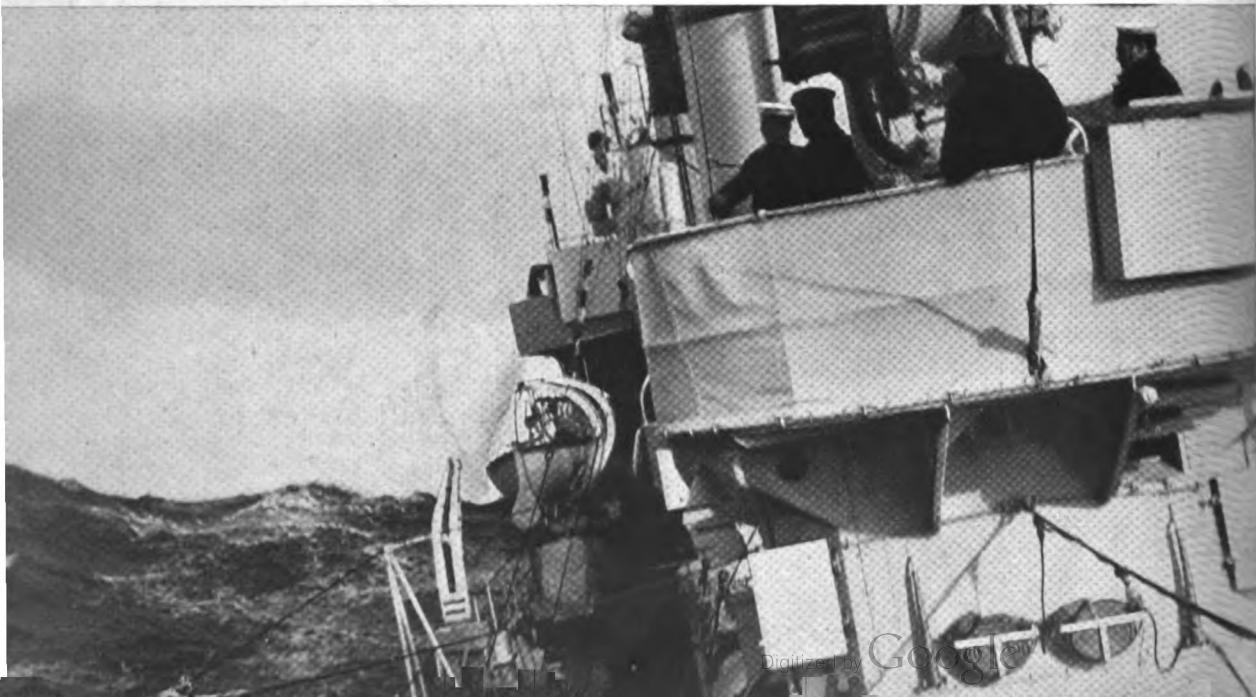
It is a grim fight. And it is a fight which knows no boundaries.

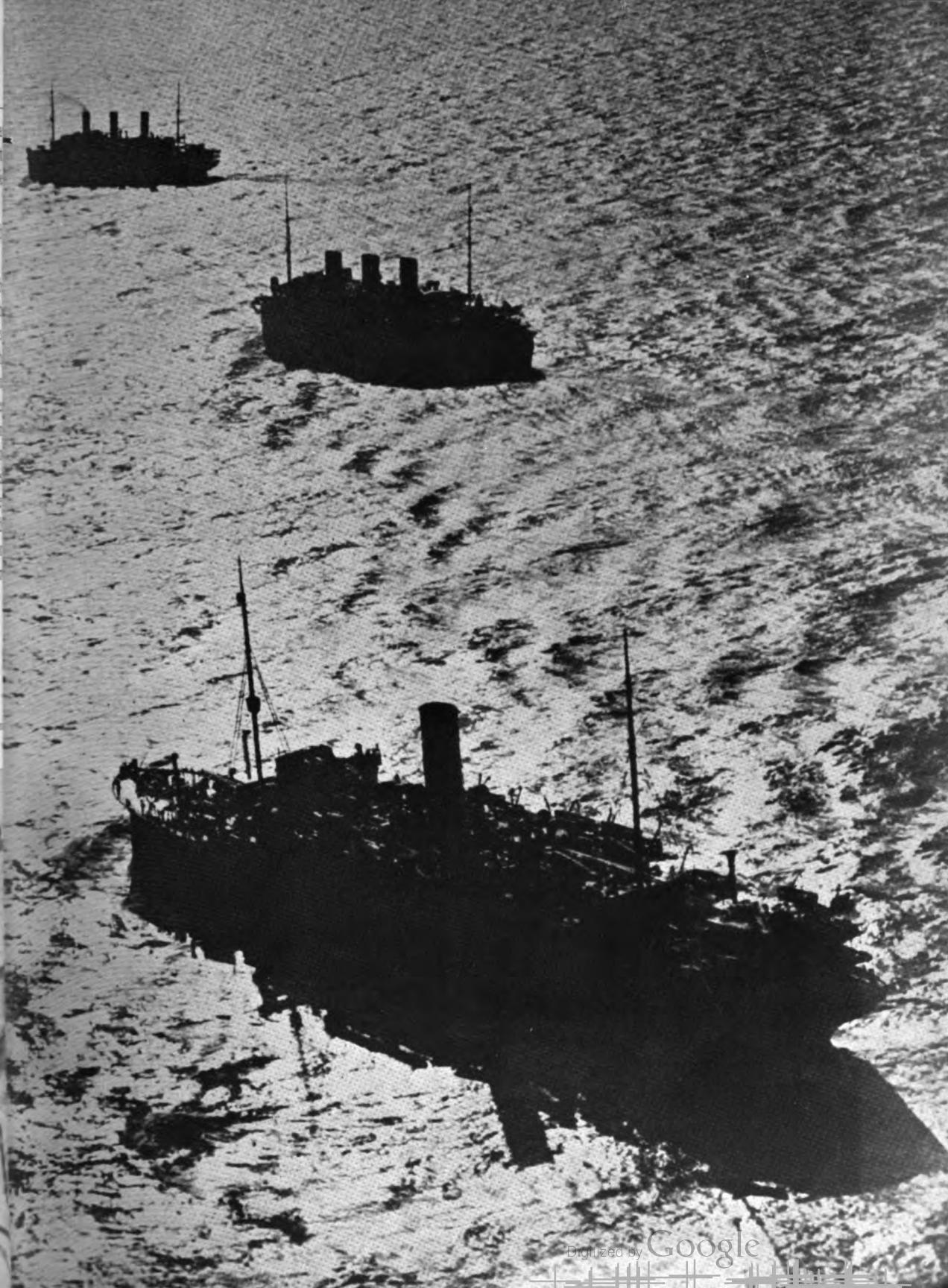
In the blizzards of the Arctic, amid the thunder of the grey Atlantic rollers, in the blinding, parching heat of the tropics, among the sparkling, dancing seas of the Trades, the struggle goes on. Some fine ships have gone to the bottom, mutilated and shell-torn, amid scenes of sickening horror. Many thousands of men, fine seamen all of them, have lost their lives. But always the ranks are closed. New ships are built in Britain's shipyards. More and more men, bred in the long tradition of British seamanship, come forward to sail in them.

And the lifeline holds firm.

Below : A British destroyer—part of the escort of a large convoy—makes way through choppy water.

Right : "The Convoy arrived safely"—home-coming ships seen from a Coastal Command aircraft.





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Above : Large quantities of tanks are among the weapons of war now being sent from Britain to Russia and the Mediterranean.

Below : Heavy seas breaking over the deck of a British oil tanker.



British women are working as riveters and welders in many shipyards. Here a funnel—part of their handiwork—is lowered into position as still another merchantman grows on the stocks.





Clean, simple lines are characteristic of the modern ocean liner's deck fittings. This streamlined funnel is specially designed to minimise wind resistance.



THE MERCHANT NAVY IN PEACE TIME

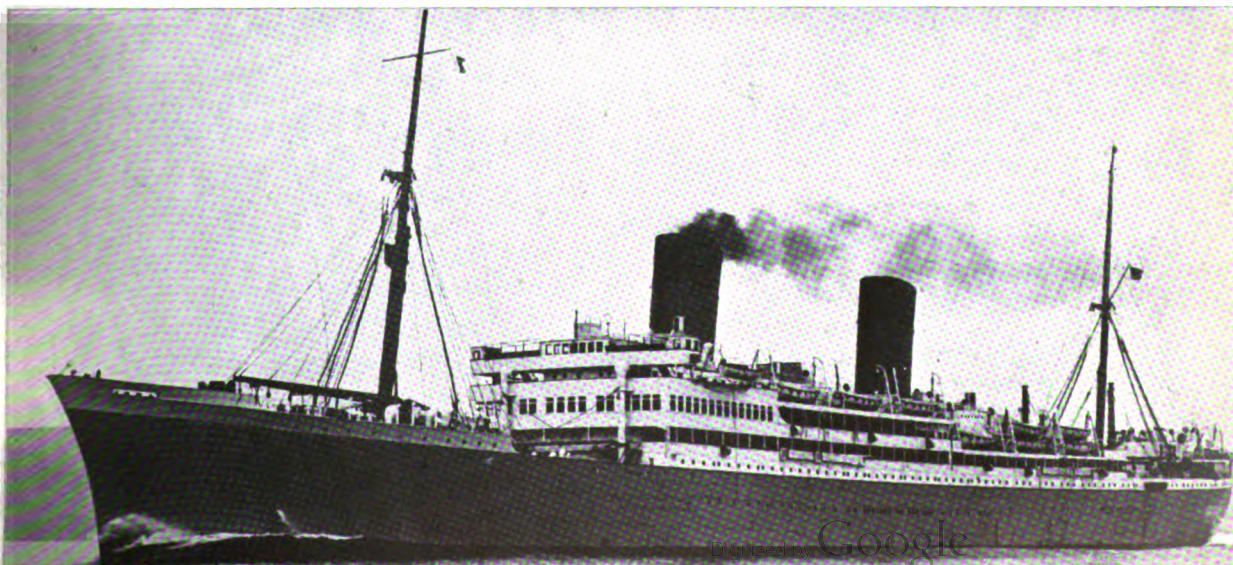
War came very suddenly to the Merchant Navy. Essentially a peace-time organisation, designed to assist commerce between nations and to carry passengers, speaking every conceivable tongue and dialect, across the world and back again, the Merchant Navy could not, as did the fighting Services, make ready for war during the year of uneasy peace which followed Munich.

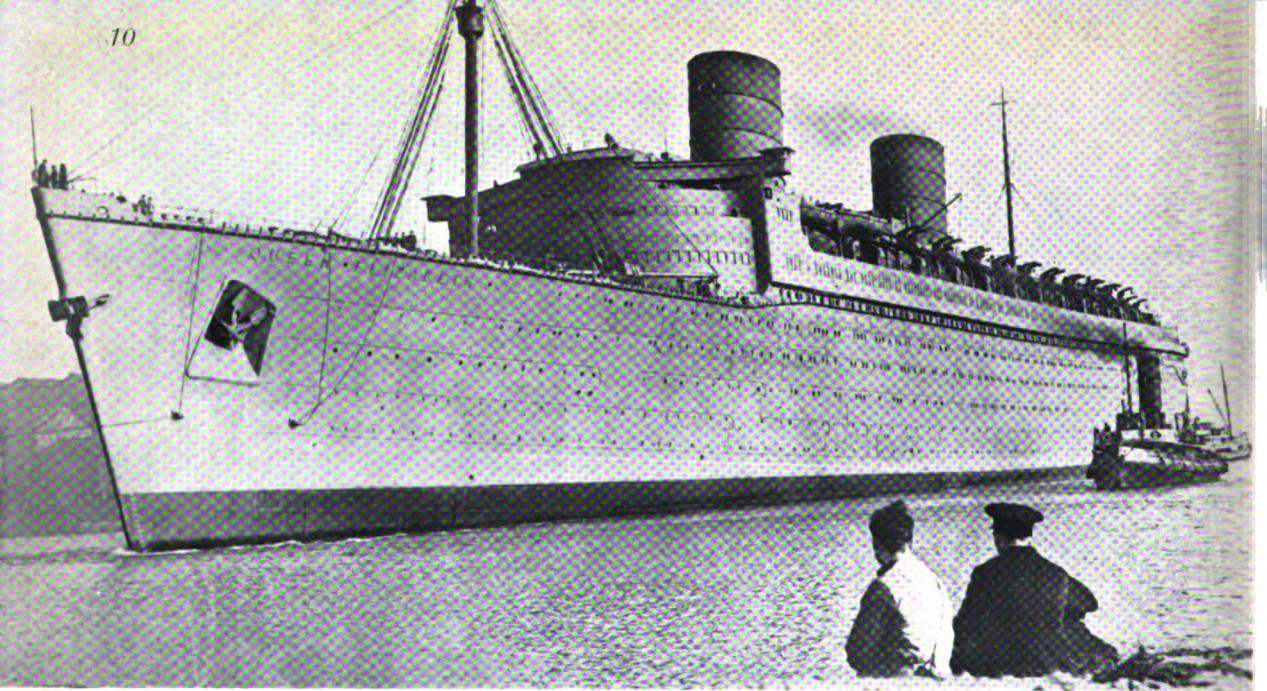
International Law prevented Britain's merchant ships, scattered, in September 1939, at every corner of the globe, from carrying any form of defensive armament in peace time. A merciless Nazi U-boat

campaign began immediately upon the outbreak of war, and many merchant ships, their engines designed for economy rather than speed, failed to run the gauntlet. More than one skipper who had survived the U-boat campaigns of the last war went down with his ship before he could be given the means of defending it, or be absorbed into the convoy system.

All manner of ships came home in September 1939, across waters which held a new and hidden peril. Great, graceful passenger liners, ready to cover their dazzling paint with sober grey, to exchange their passengers for troops and

A passenger vessel of the Union Castle Line, used in peace time for the run from Britain to the Cape. Many ships of this type are now doing invaluable work as troopships.





stores. Grimy, storm-battered little trawlers, their decks cramped, rust-streaked and smelling of fish, to take over one of the most hazardous duties of war—the minesweeping and minelaying patrol. And in between these two extremes, cargo-carrying ships of every type, ready and willing to accept, with all its implications, the task of carrying on with their peace-time duties. And only by knowing something of the task of the Merchant Navy in peace time can we appreciate its work in war.

First among the Merchant Navy's world-wide peace-time operations comes the carriage of passengers, mail and freight at high speeds. For this purpose, passenger liners are used—big, fast, luxuriously fitted ships, many-decked, and gleaming with polish and paint. The largest of these vessels are enormous, graceful creatures, such as the *Queen Mary* and *Queen Elizabeth*, crossing the Atlantic in well under a week, at well over 30 land miles an hour.

In the spring of 1940, a long grey ghost of a ship slipped from a Clydebank fitting-out basin to make her way quietly to the sea. Secretly, without passengers, the "Queen Elizabeth" began her maiden voyage.

With an approximate gross tonnage of 85,000 and a length of 1,031 feet, the "Queen Elizabeth" is the largest and longest ship ever built (up to the outbreak of war). Launched by Queen Elizabeth in September 1938, under the shadow of the Munich crisis, she was completed six months after the outbreak of war. Already, Hitler had boasted of his "impenetrable blockade." Yet the "Queen Elizabeth," painted battleship grey, her scuttles blacked out, sailed swiftly and serenely across the Atlantic, without escort. With her sister ship, the "Queen Mary," she is now working for the United Nations' war effort.

Passenger ships vary greatly in size, the extent of difference depending upon the duties which they have to perform, and, more important still, upon the ports to which they usually trade. The smallest type of sea-going passenger ship is represented by those which run between the south coast of England and the northern coasts of France and Belgium, or across the stormy North Sea, from Newcastle to Bergen, from Tilbury to Gothenburg. In all these ships, big and small, the recent tendency has been to increase



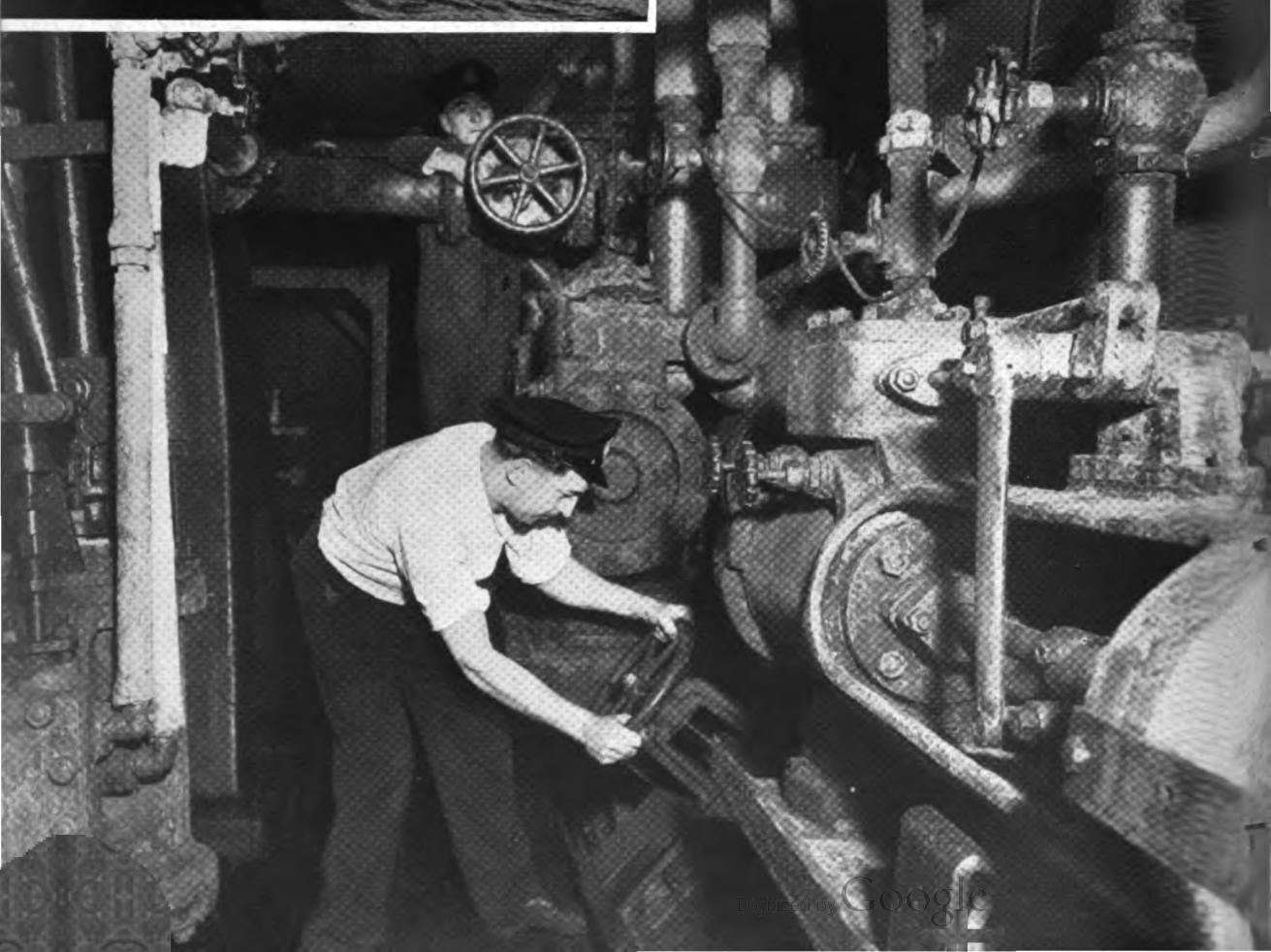


luxury and amenities for passengers. At the same time, every attention is paid to easy handling of cargo.

In direct contrast to these luxury ships—in which it is perfectly possible to make a long voyage without catching more than a glimpse of the sea—come the coal-burning (and therefore rarely spotlessly clean) tramps; cargo-carrying vessels which go from port to port, picking up a freight wherever they can. Since certain

Left : Before the war, this trawler was a unit of the Grimsby fishing fleet—now she is a unit of the British Navy, and does valuable patrol work. She has destroyed one Nazi aircraft and has another "probable" to her credit.

Below : Testing the engines of one of H.M. tugs.





The Pool of London—a busy scene on the River Thames, in the heart of the City of London.

ships are usually specially suitable for certain routes, the career of a tramp steamer is less haphazard than one might think. A 10,000-ton tramp—and this measurement represents not the actual weight of the ship, but its internal capacity, each "ton" representing 100 cubic feet—may, for example, load in a South Wales or a northern port, with coal for the River Plate. It is practically certain that any tramp which has carried coal—and is, therefore, built to take a "bulk" cargo—will carry grain upon her return journey. So the grain is poured direct into her holds—under the careful eye of the First Officer, whose duty it is to supervise stowage, making sure, if a mixed cargo is carried, that no easily contaminated commodity (such as tea) is placed near any possible source of contamination. Grain,

however, usually forms a cargo on its own, being packed loose in the holds, which are divided at strategic points by boards, so that it cannot shift and upset the balance of the ship. Sometimes a layer of grain packed in sacks is placed on top before the hatches are closed, to keep everything tight.

Next, our tramp may take her grain to a North African port, where it is unloaded by suction pipes in an incredibly short space of time. And then, if there is no cargo for her, a somewhat unpleasing northward trip "light"—that is, unloaded, so that the "Plimsoll line," which must not disappear below the water when the ship is loaded, shows high above the stormy waters of the Bay of Biscay. Even the staidest of ships will dance like



Aboard one of Britain's naval trawlers in Northern waters. Contending with gales, enemy mines, aircraft and U-boats, she rolls steadily and unflinchingly along her patrol lines.

a dervish in these circumstances. But the crew is well accustomed to such trips, and so long as no fog—the one weather condition with which seamen are almost powerless to cope—is encountered, there will be little delay or difficulty. And then, perhaps, to a Northern European port for a load of timber. Or a trip—in convoy, even in peace time—behind the icebreakers through the Kara Sea. And ultimately home. Home to a British seaport, where the high screams of seagulls mingle with the deeper, more penetrating note of ships' sirens, where noisy tramcars bring the stevedores down to the dockside, and a small crowd gathers from nowhere, to watch with a critical eye as the new arrival casts anchor, or makes fast to the quayside. The Captain prepares to go

ashore to make his report to the owner's agent, while the men hang over the side, exchanging gossip with the waiting bum-boatmen, and the cook brings out the inevitable canary, cage and all, to have its first look at England.

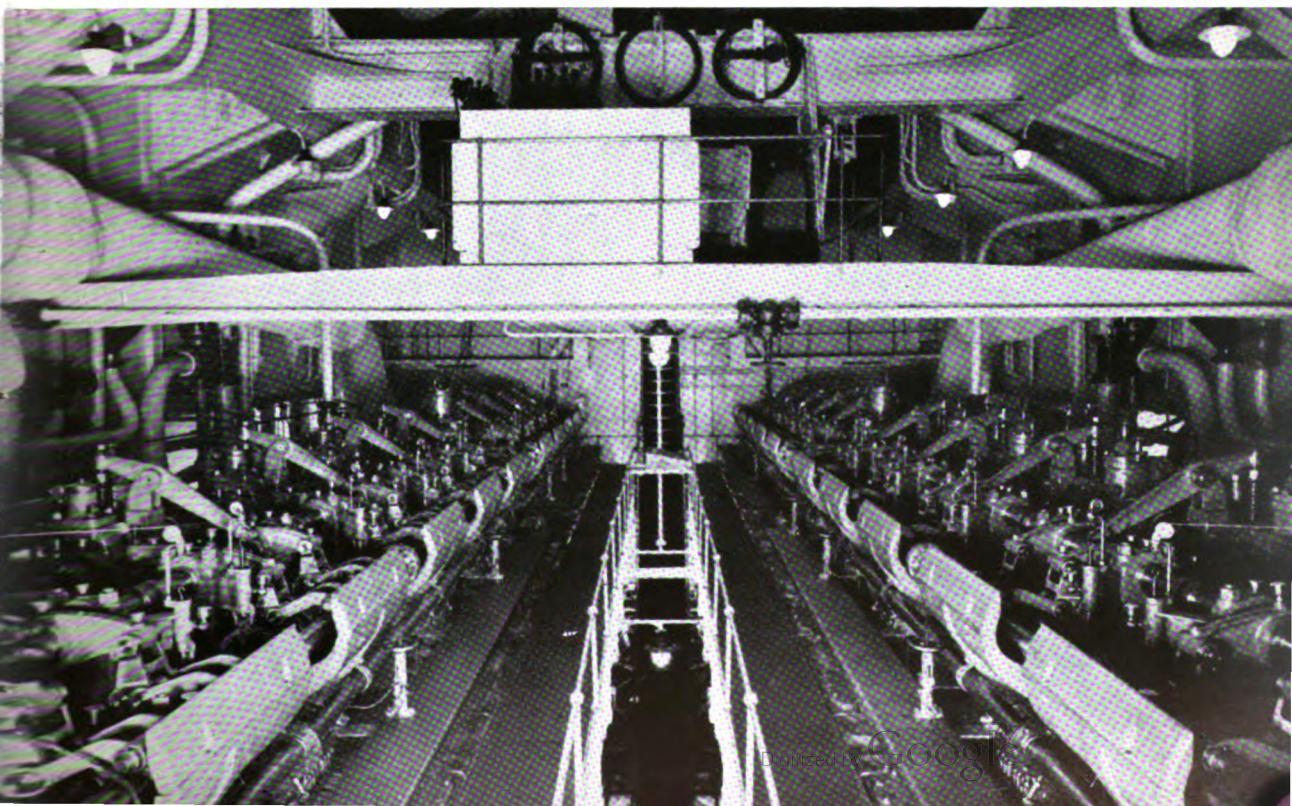
Few tramp skippers would exchange their ship for the *Queen Mary* herself. But the tramp has her limitations. She is of little use, for example, to the merchant who wishes to export a fairly small amount of goods without waiting until the ship has a complete cargo. He is better served by the cargo-liner which runs to a regular time-table, between a regular set of ports, carrying miscellaneous or specialised freights, according to her type and the routes she follows. The cargo-ship has

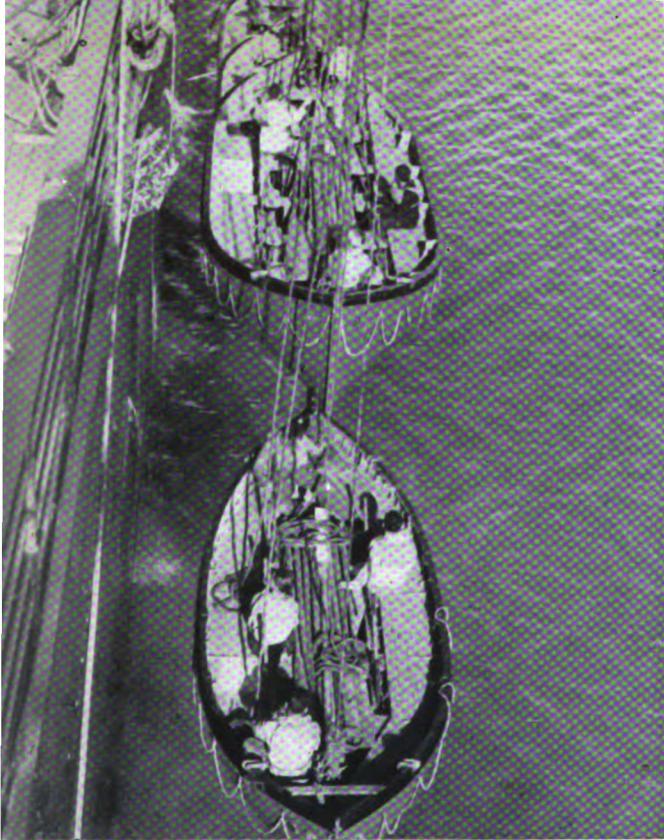
tended more and more to specialise. Some ships, equipped with special refrigeration plants, are intended exclusively for carrying frozen meat. Others, their holds divided into separate compartments, into which cold air or special gases can be pumped, carry fruit. These ships, because of the value and the nature of their cargo, must be kept scrupulously clean and usually burn oil-fuel. For the same reason they must travel as quickly as possible. Because of these things, they have become increasingly popular with passengers—a fact which helps to account for the attractions, such as swimming pools, with which the regular passenger liners now tempt prospective travellers. Board of Trade regulations permit cargo steamers to carry up to twelve passengers without registration as passenger ships—a step which calls for many added safety

precautions, all taking up valuable deck-space. Fruit boats rarely carry many passengers, since they are usually small vessels, built for easy entry into the small, shallow tropical ports which serve the plantations, but other types of fast cargo ship often find space for as many as a hundred passengers, or even more.

The problem of safe and economical cargo stowage has created many specialised types of merchant ship. Least popular as a berth is the oil tanker. Crude oil and petroleum, transported in huge quantities from Persia and Central America, do not combine at all well with any other type of cargo, since any kind of foodstuff would be contaminated by their fumes, while their inflammable and explosive nature calls for careful handling and quick transport, tending at the same time to

The 14,000 horse-power Diesel engine of a modern motor-vessel.





Lifeboats ready for launching—one of the many safety precautions without which no British or British-controlled ship is allowed to sail. They contain sufficient food and water for several weeks.

discourage passengers. And, above all, the use of drums or barrels, essential for stowing liquids in the hold of a general cargo ship, would cause waste of time, space and money.

The tanker, specially built to meet these difficulties, is an unattractive looking ship. Long and narrow, she carries her funnel, engines and living quarters aft, while the rest of her hull consists of metal tanks,

connected by pipes. Her bridge is mounted amidships over the tanks, connecting with the living quarters by long, high-mounted gangways. Oil is usually a "one-way" cargo, so water is pumped into the tanks on the return journey in order to adjust balance. Since crude oil rots metal, the tanker's life is a short one. And since she is built for quick loading and unloading by pump, she is rarely in port for more than a few days—hence her unpopularity. The risk of explosion, followed by fire—and a burning tanker, her cargo blazing on the water around her, is an awe-inspiring sight—is always present. For this reason, tanker crews are paid at specially high rates.

Many other types of vessel, far too numerous to describe, make up the strength of Britain's peace-time Mercantile Marine—coasters plying on two-day trips from end to end of Britain. Lightships, keeping their lonely vigil through the months of fog, gales and bitter seas. Hardy little trawlers and drifters, wresting a valuable and essential part of Britain's food supply from the angry North Sea. Cable ships carrying out, usually under stormy conditions, their work of testing and repairing the ocean cables so that nation may speak to nation.

All these are ships of peace time. And the men who sail in them are men of peace, trained to fight only against the elements. Yet if ever the courage of these men had failed, in the face of shell, torpedo, mine and bomb, on that day Democracy would have died.





SEA ROUTES IN PEACE AND WAR

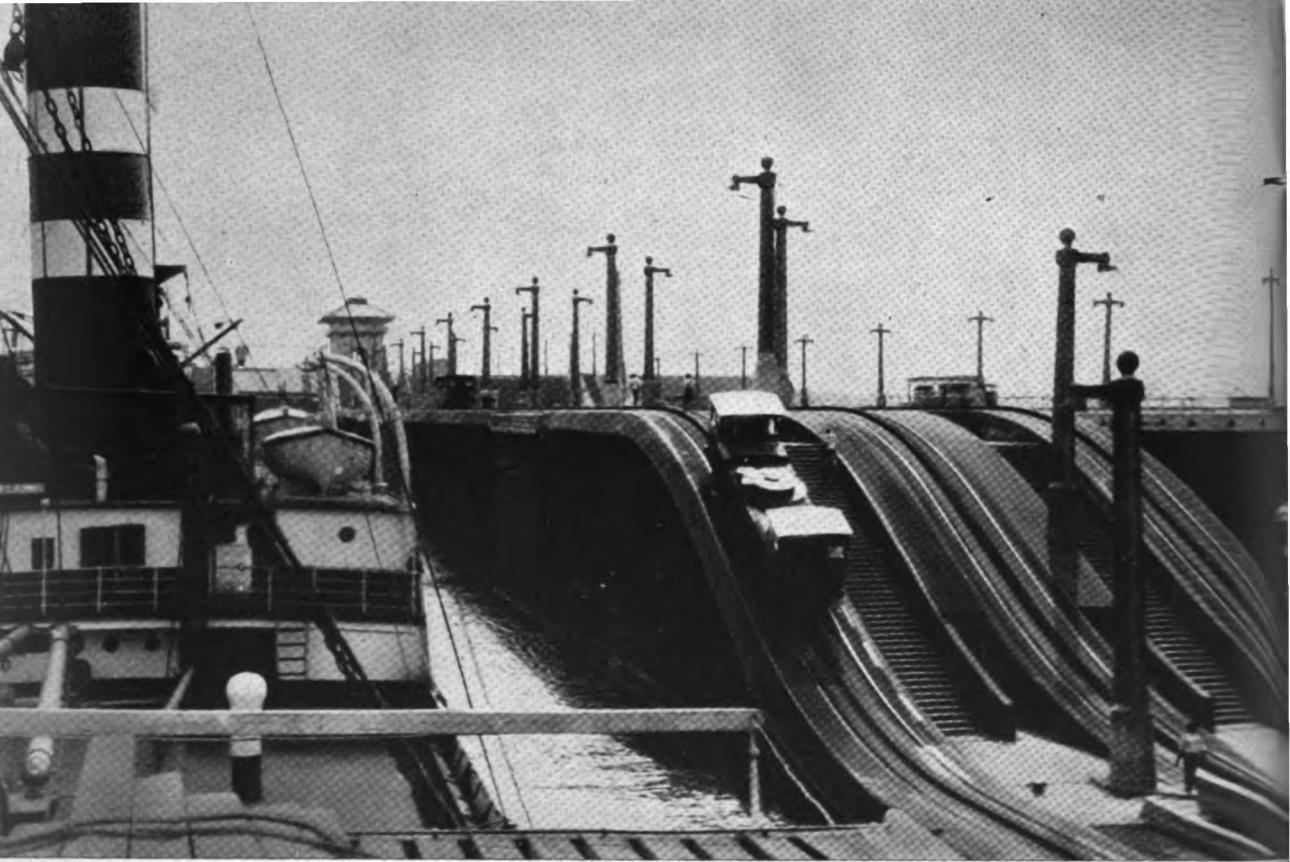
To-day, British merchant ships are sailing upon roughly the same routes as in peace time, carrying, with some adjustments, much the same cargoes. Obviously, the exact courses they take are a closely guarded secret. But in general, it may be said that the main Empire trade routes, vital in peace time, incredibly important in war, are still open.

The peace-time trade routes may be listed roughly as follows :—

1. Transatlantic : This covers all the ports between Montreal in the north and Savannah in the south to Southampton, Liverpool, Glasgow and Manchester.
2. Pacific : North-west coast to Britain, via Panama. This route is of immense importance in the grain, lumber and fresh

A wintry scene aboard a British patrol vessel in Northern waters. In spite of these conditions, a ceaseless watch must be maintained, and guns must be constantly "de-iced."





The Panama Canal—vital junction of some of the world's most important trade routes.

fruit trade, and some of the fastest small ships in the world have been built for it. Via Panama, too, goes much of the British trade to the Antipodes.

3. The River Plate : This takes in such ports as Buenos Aires, Montevideo and Rosario, and, thanks to river craft, gives direct connection with ports several hundred miles up-river. The principal cargo carried on this route is coal outwards from Great Britain, grain homewards. Upon these stable "two-way" cargoes has long depended much of the success of Britain's tramp shipping. Big, fast meat-carrying ships also trade from the River Plate.

4. The Cape : The run between South Africa and Great Britain is a vital one for passengers and mails, as well as for

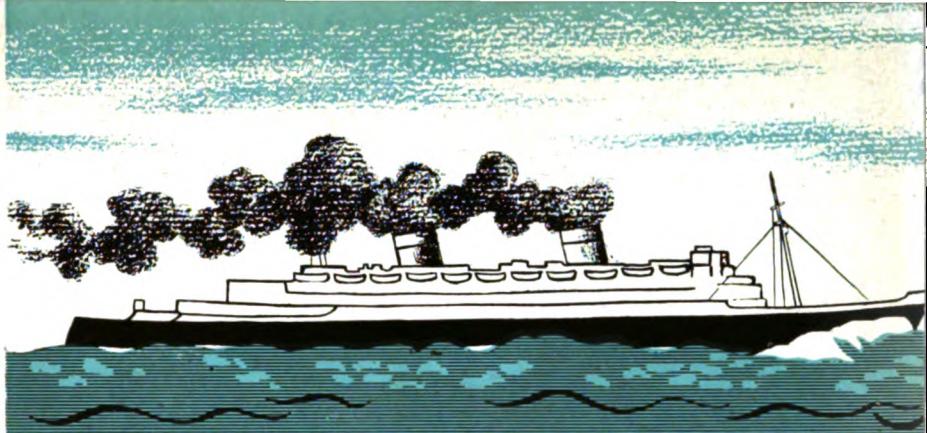
foodstuffs, particularly fruit. It is also an important main line junction on the way to Australia.

5. India—Australia : This route connects Britain, via the Mediterranean and the Red Sea, with the Orient, Sydney, Melbourne and other Australian ports. Tea, cotton and other goods are carried, as well as large numbers of passengers. In peace time a large proportion of British shipping to and from the Far East travels via Suez.

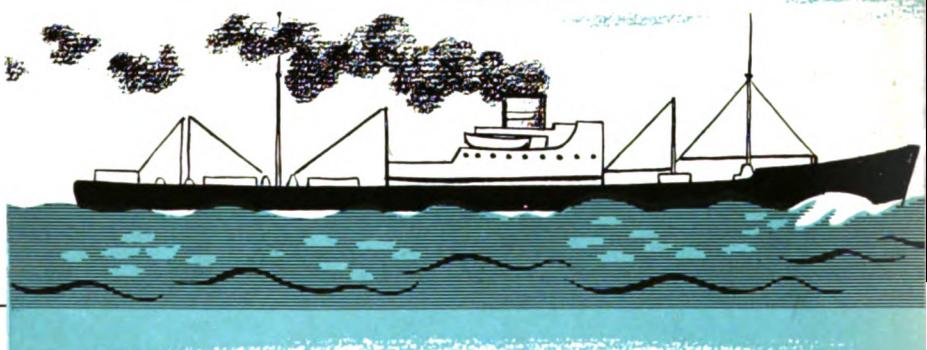
From this brief summary something may be gathered of the world-wide nature of Britain's trade routes and the hugeness and complexity of the task performed by her Merchant Navy.

SOME SHIPS OF BRITAIN'S MERCHANT NAVY

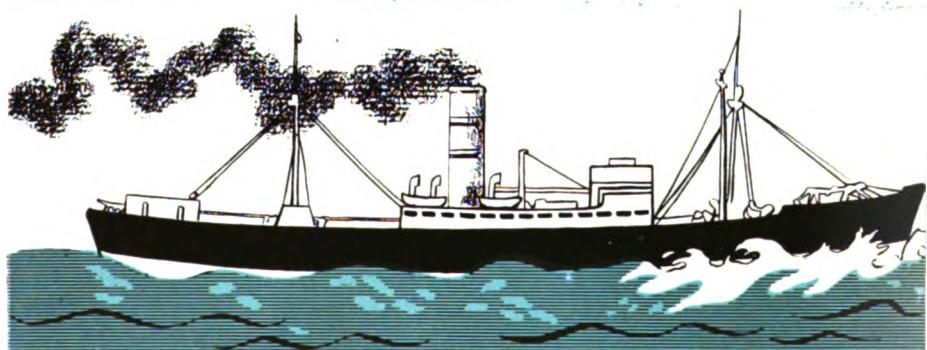
A huge modern passenger liner.



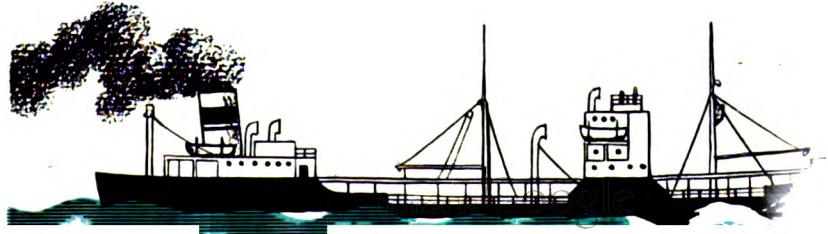
*A small, fast cargo liner—
speed about 16 knots.*

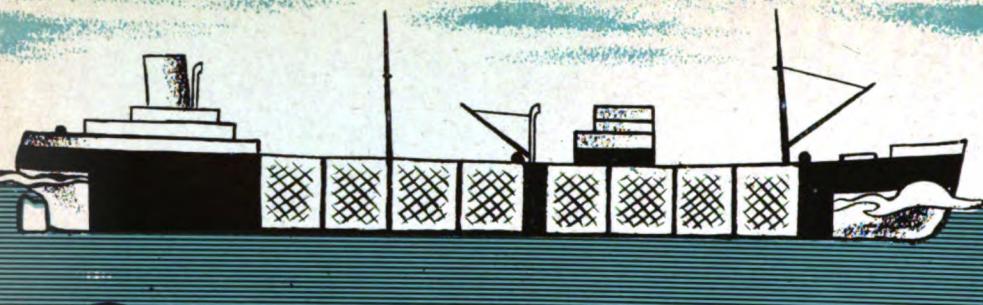


*A ship designed specially
for the Mediterranean
fruit trade.*

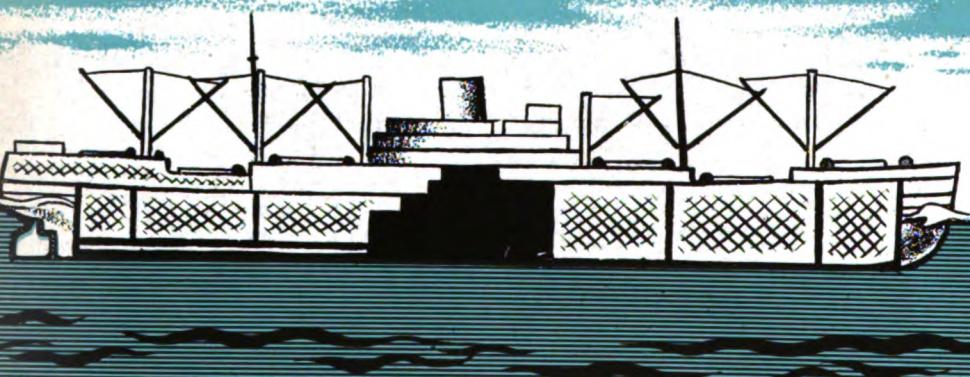


A tanker.

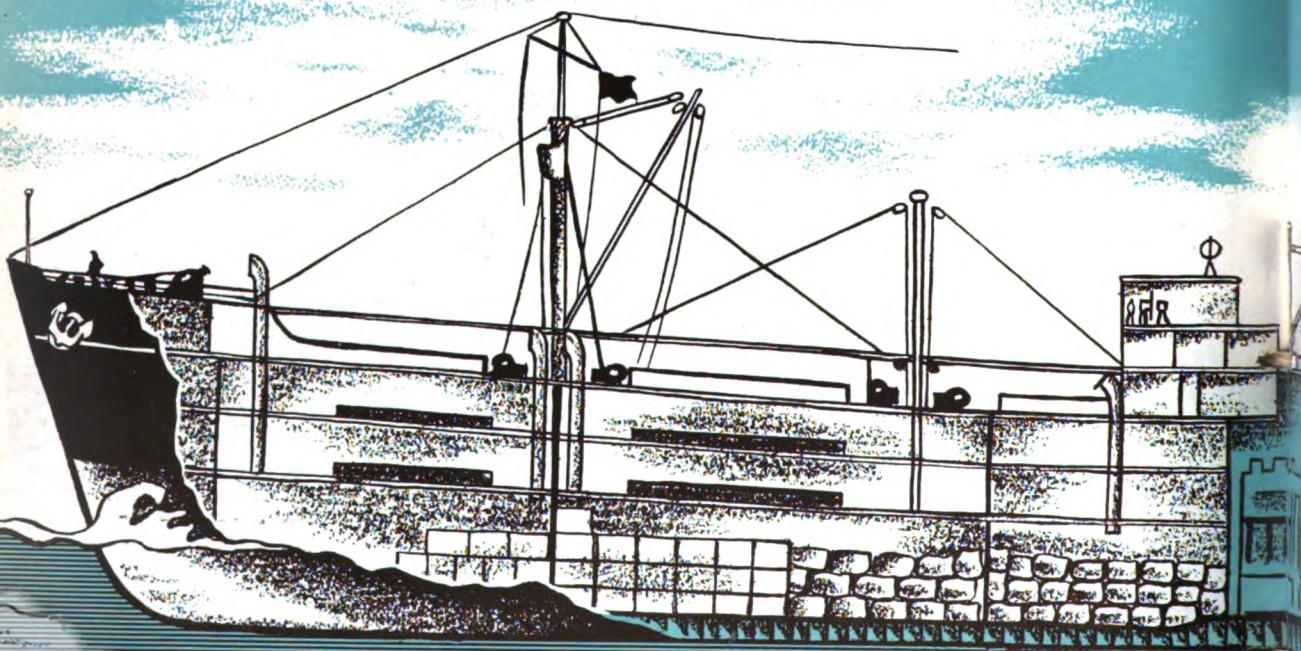




Left : Cross-section of a tanker. She carries about 12,000 tons of liquid cargo in big treble tanks. All her machinery is carried aft.



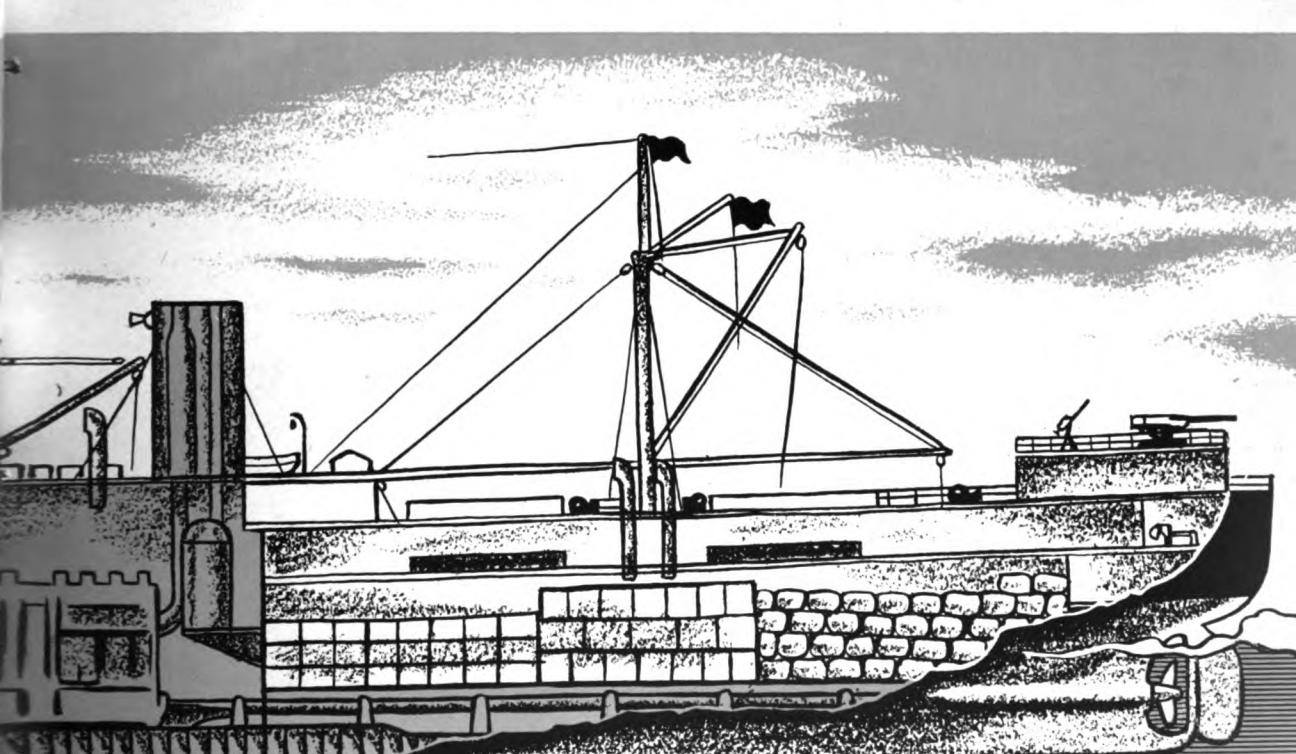
Centre : A meat carrier—spotlessly clean, with room (in the dark space below the funnels) for passengers, and storage space for the equivalent of 137,000 carcasses of mutton. Her speed is about 17 knots.



Below : Cross-section of a modern general cargo vessel (oil driven). Her cargo capacity is about 9,000 tons. Each of her holds has derricks which lift weights up to five tons.



Inside one of the most cheerful places on board—the cook's galley on a modern merchant ship. No matter what conditions prevail outside, hot meals are produced on time.





*A MAP OF
showing the network of peace-time trade routes (the thickest lines*



THE WORLD

denoting the most important routes) which spread outwards from Britain.



The great "armada" to French North Africa, seen from one of the aircraft which helped to protect it. British naval and merchant ships cover the sea as far as the horizon. Night and day, fair or foul, wherever the convoys sail, the Royal Navy maintains unceasing vigilance.



CONVOY . . .

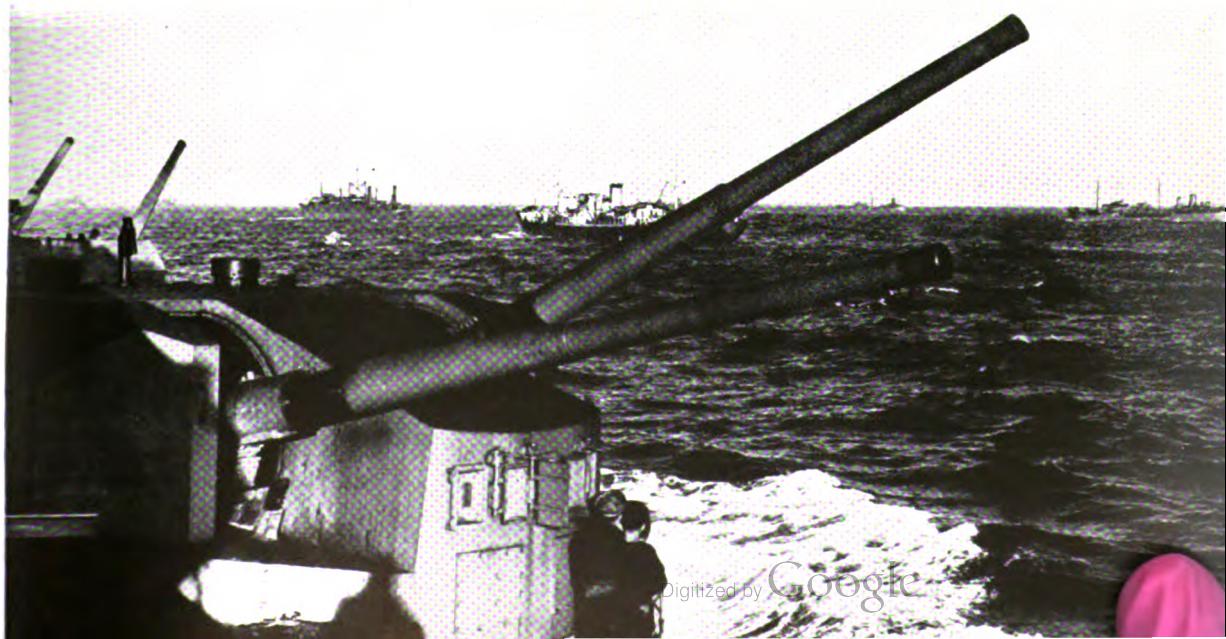
As soon as possible after the outbreak of war, the whole of the British Merchant Navy, placed for the duration under the direction of the Admiralty, was arranged in convoys. The preparation, assembly and operation of groups of ships to run under the protection of warships are not new. The system dates back to the earliest history of ships and the sea, to times when priceless cargoes of jewels, silks and precious metals were shipped in convoys as a precaution against marauding bands of sea robbers. In the Napoleonic wars the convoys were very active. But they had to

deal with surface raiders only. To-day, submarines, fast surface raiders and aircraft have been added to the perils encountered by the convoy.

An enormous amount of planning and organisation must be done before every convoy sails, and while it is at sea. After the first few months of war, when Britain's destroyer strength had been increased, the work of organising and maintaining the convoys became a little easier, the task of the Merchant Navy a shade less dangerous. But losses were still heavy, and difficulties—inevitable

(Continued on page 28)

The huge guns of a British naval vessel, reared in readiness to protect one of Britain's convoys.





Some of the "Danger Areas" — stretches of enemy-occupied coast (white edged) close to which British convoys must pass with their vital cargoes.





A BRITISH CONVOY GOES ON ITS WAY . . .

The convoy sailed at night, in secret. More and more ships joined it, falling into line astern, as it moved slowly out of territorial waters. Now the escorting Coastal Command aircraft prepare to return to their bases, leaving the task of reconnaissance and protection to naval vessels and ship-borne aircraft. Signals are exchanged: two late-comers arrive escorted by a destroyer. So far, there is no sign of U-boats or hostile aircraft. But, night and day, as the convoy steams steadily on, the guns are manned and the escorts sweep its flanks.

when ships of different types, designed for different tasks, must act as a unit—abounded. Differences in speed are the greatest problem. Machinery varies considerably and so, too, does the human element controlling it. Thus, a convoy may spread out over many miles, with the stragglers in the rear, forming a tempting target for the lurking U-boat. As far as possible, an attempt is made to keep ships of the same size and speed together, but this is not easy if every British and Allied ship, whether newly launched or built 40 years back, is to be used to the last ounce of its capacity.

A large convoy, whether seen at close range, or as a silhouetted procession of grey ships upon a grey horizon, is a stirring sight. Ships of many nations steam side by side—ships flying British, Netherlands, Norwegian, Polish, French, Belgian, Yugoslav, and Greek flags. Trim, dainty

ships, disdaining the swell which heaves against their sides. Small, squat, ugly ships, which drive, nose downward, through the water, making up in determination for what they lack in grace and power. Ships bearing the names of jewels and goddesses, of flowers, cities, castles and rivers. And always, ahead and astern, there are escorting warships—cruisers bristling with guns, or small, fierce destroyers, while more destroyers race up and down the flanks of the convoy, shepherding, marshalling, protecting.

The convoy sails under the leadership of a Commodore—usually one of the retired naval men who, on the outbreak of war, immediately flocked to offer their services, begging to be allowed to sail in any capacity. And before a convoy sails, the Captains of every ship meet to receive detailed instructions, and to discuss problems which arise from them.

A British convoy, protected by balloon barrage from dive-bombing attacks by enemy aircraft.





"Convoy Conference"—captains of merchant ships, about to sail in convoy, receive advice and instructions. Below: The end of a day's hard work—officers aboard a tug—a small but vital part of the Navy.



Since the outbreak of war well over one hundred thousand British and Allied ships have sailed in convoy, totalling hundreds of millions of sea miles, the equivalent of several thousand times round the world. Heavy though losses have been, they amount to only one ship sunk for every 200 which, sometimes limping home after a brush with the enemy, generally arriving on time and in fine condition, have brought their cargoes safely into port.

Each year the Merchant Navy brings home between 30 and 40 million tons of foodstuffs and vital raw materials.

And, as Britain swings over from the defensive to the offensive, there is more

and yet more work for her merchant ships.

A huge proportion of Britain's vast war production—greater per head of the population than that of any other nation in the world—is shipped overseas. Millions of tons of military stores, thousands of troops, have been carried to the Mediterranean and the Middle East—quickly, secretly, punctually.

And British merchant ships—ships which in darker days helped to rescue four armies, from Norway, Dunkirk, Greece, and Crete—formed the major part of the greatest armadas in history; the heavily escorted transport fleets which carried huge Allied armies to victory in the Mediterranean.

This huge Allied convoy was attacked almost unceasingly for four days, yet managed to deliver its precious cargoes safely at a northern port.

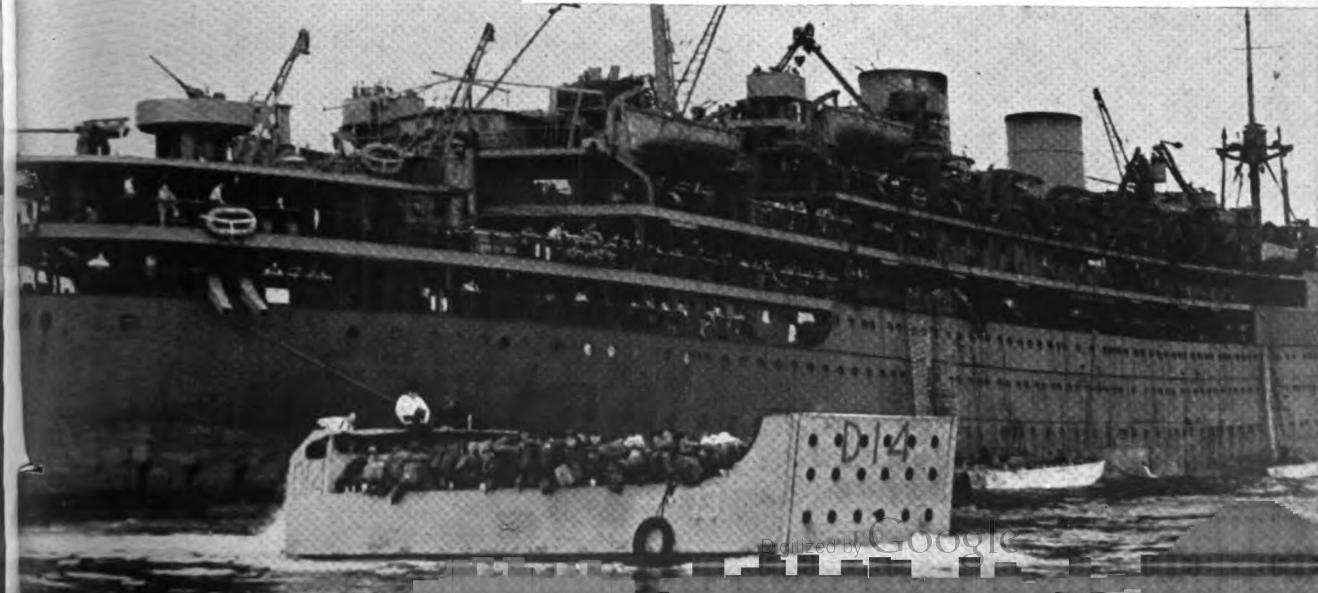
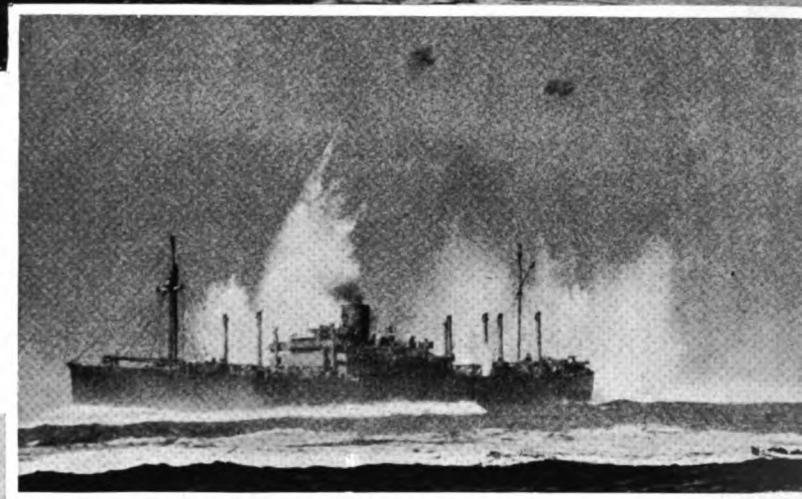




Above : Cases of food being unloaded by lighters at Malta. Axis attempts to break Malta's supply-lines were desperate but unavailing.

Right : A "near miss"—but this British merchantman reached the fortress of Malta safely.

Below : Landing craft leaving a troop transport off Algiers.





THE MERCHANT NAVY HITS BACK

To-day, no British merchant ship is completely helpless in the face of individual attack by the enemy. The main and by far the most effective protection is, of course, given by escorting warships, equipped with every type of gun and torpedo, with depth charges to deal with submarines, and with facilities for laying smoke screens.

Minesweepers, too—most of them small, converted steam trawlers—are doing invaluable work, while shore-based long-range aircraft are playing an increasing part in the protection of convoys.

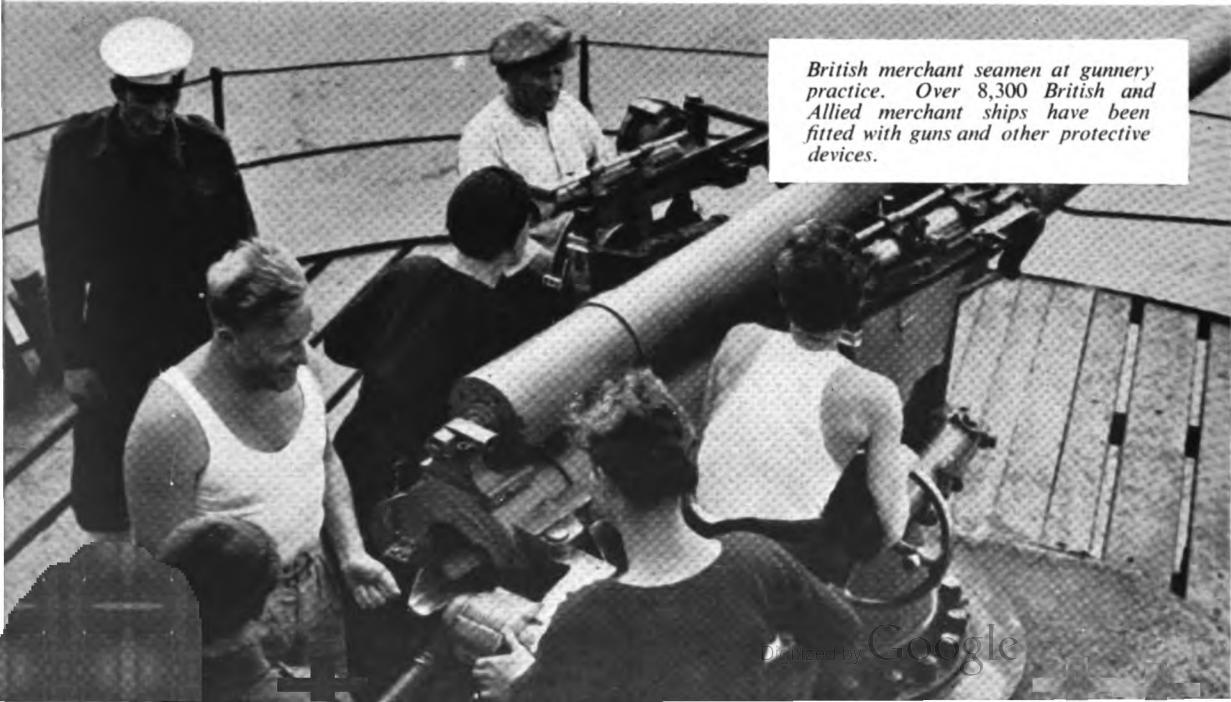
But even so, every merchant ship is

given—and takes fullest advantage of—its own individual chance to hit back.

As soon as Britain's merchant ships reached home ports after the outbreak of war they were fitted with guns, usually mounted aft, since they were intended as a defensive rather than an offensive measure. Three thousand ships were thus equipped during the first year of war—a task which was neither simple nor straightforward, since ordinary merchant vessels need certain structural alterations and strengthening before they can withstand the shock of a gun recoil.

Anti-aircraft guns have also been added

British merchant seamen at gunnery practice. Over 8,300 British and Allied merchant ships have been fitted with guns and other protective devices.





Above : Manning an anti-aircraft gun aboard an escort vessel. Below : The crew of a multiple pom-pom gun takes a rest during a lull in enemy attack. The pile of empty cartridge cases tells its own story.





A scene aboard a merchantman in Arctic waters—black fog, caused by the air being even colder than the water, has descended, isolating the ice-crusted ship in a dim, numb world of its own. Every ten seconds the bell on the signal bridge must be rung, as a warning to other ships—the only practical method of avoiding possible collision.

to many ships, while others are fitted with rapid-fire machine-guns, which, in the hands of a determined gunner, are the terror of the dive-bomber. Gunners were at first provided by the Navy and the Royal Marines, and gunnery instruction was carried out at sea. But in spite of the eagerness of all ranks—cooks, cabin-boys, stewards and seamen—to learn gunnery, there was a shortage of gunners. To help ease the shortage the Army lent some of its gunners to the Merchant Navy. Superficially a merchant gunner is a man wearing sea boots and a fawn, hooded jacket. Underneath he may be wearing Army khaki, Navy blue or a merchant seaman's jersey. Whatever he wears, he never loses an opportunity of having a shot at the enemy.

There are now tens of thousands of these gunners, working in crews of from five to twenty-five or even more, and keeping the guns manned night and day. Each of them may be called upon to handle any one of 18 different kinds of gun. And, although their primary function is to beat off rather than to

destroy the enemy, the guns of Britain's merchant ships have brought down or severely damaged well over 200 enemy aircraft since the outbreak of war.

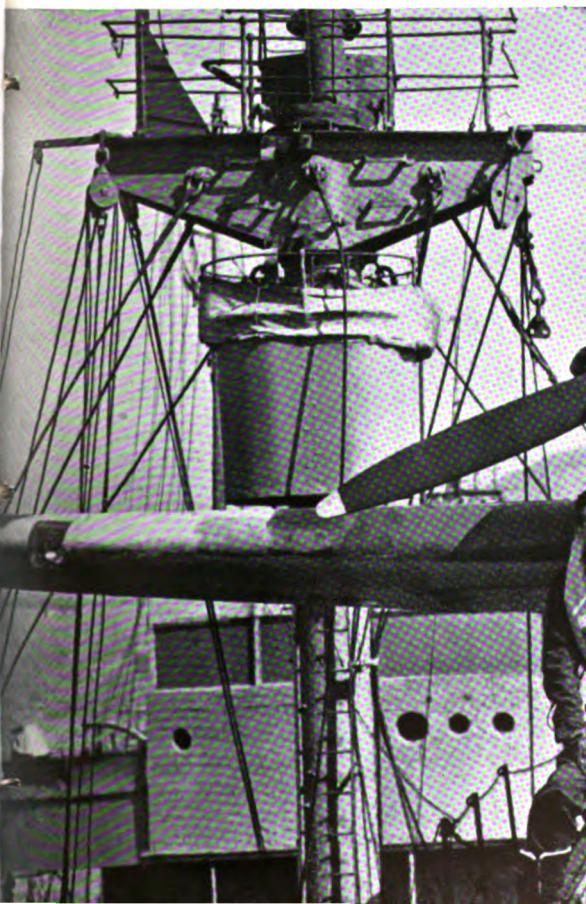
The U-boat and the long-range bomber remain the most effective methods of attack against Allied convoys. The Nazi's famous "Secret Weapon"—the magnetic mine long known in principle to most Admiralties but first used by Germany—was countered in a few weeks by British scientists. The task of hunting down the U-boats belongs to the Navy. But against attack by large forces of long-range bombers, the convoys needed more protection than that afforded by anti-aircraft fire, accurate and effective though it was—and is. And so it was that the Merchant Navy acquired yet another weapon—the "Sea Hurricane." Britain's most versatile fighter aircraft, long proved to be a match

for the German bomber, now goes to sea with the Merchant Navy as a "catapult" plane. At least one "Hurricane"—and usually several—complete with pilot, second pilot and maintenance crew, has sailed with most of Britain's recent convoys, achieving great success in intercepting and shooting down enemy bombers.

The "Hurricane" is usually carried aboard one of the larger ships of the convoy, mounted at the after end of a steel runway, which runs forward from the foremast to the bows, giving a short take-off which is supplemented by the action of an automatic "catapult."

Each pilot who takes off to intercept enemy raiders knows that, unless the encounter takes place within easy flying distance of friendly territory, he has no hope of a better end to his flight than a crash landing on the sea. All too many of these aircraft have been lost, but they have been lost while saving many times their own worth in shipping and vital cargoes; rubber dinghies and special lifebelts, coupled with explicit arrangements for the exact position of landing in relation to the convoy, have saved most of the pilots to fight again.

The catapult "Sea Hurricanes" now carried by many British merchant ships are doing vital work in countering attacks by enemy aircraft.





*One of Britain's war-time
merchant seamen.*



THE MEN OF BRITAIN'S MERCHANT NAVY

Little glamour is attached to the men of the Merchant Navy. They wear no uniform. Their work—except when some more than usually gallant action causes a two-day sensation in the world's Press—is not spectacular. It is grim and grimy. It is often cold, and usually desperately uncomfortable. Always it is carried out under conditions of extreme tension, for

no warning precedes the splintering crash of a torpedo through steel plates which were not built to withstand it.

Since September 1939 there has been little rest for the Merchant Navy. The shortage of ships and seamen with which Britain began the war meant that every vessel must be used to its utmost capacity.

Some of the crew of a British merchant ship, photographed upon arrival at a northern port.



Only vital necessity permitted a ship to go into dock for overhaul, and new records in loading and unloading were set up. So there was little shore leave for British merchant seamen—little but dirt and work, sweat, blood and storms, amid seas dark with murder. The North Atlantic was no sinecure for any seaman. And the middle of the Atlantic, a thousand miles from land, was a lonely and cheerless place to find oneself swimming amid the wreckage of a torpedoed ship, or floating, without food or water, on a half-submerged raft.

Weather conditions in the Atlantic during each winter of the war have been appalling. This has added considerably to the discomforts of the fishermen and merchant seamen engaged, in their small, tough craft, on the dangerous job of

keeping the seaways clear of enemy mines. Ship after ship has come back to port with icicles five feet long hanging from bridge and rigging. Spray ripped from the waves becomes hard lumps of ice by the time it crashes against the bridge windows. Yet never once, throughout five bitter winters, have these men failed in their duties. Spending hours in sea-boats filled with icy water, blinded by snow and hammered by lumps of frozen spray, with great green seas boiling over bow and stern, these men carry on with a task that the world, and indeed they themselves, regard as just another job. And all this is merely a background to the murderous assaults of German U-boats, to the constant peril of bomb, torpedo and mine, of all hell lurking above and below, ready to open at any minute of the day or night. Yet somehow, in the face of fog, darkness,

These British merchant seamen were rescued—only just in time—from an upturned lifeboat. In spite of these ordeals, survivors of torpedoed ships are always impatient to return to sea as soon as possible.





Above : The man at the wheel—calmly, quietly, amid gales, high seas and enemy attacks, he remains at his post as the ship ploughs steadily on.

Below : "Down below"—amid the heat of the furnaces and the close, greasy air of the engine-room, the engineer goes quietly about his tasks.



ice or blizzard, the engines are kept turning, the watch is maintained and the guns are manned.

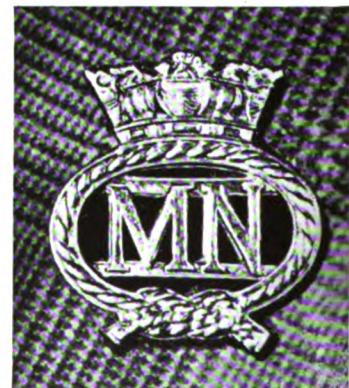
The ships of many European countries sail the seas with the British Merchant Navy, freighted with the food and munitions and stores of the embattled United Nations : Norway, Holland, Greece, fighting France, Belgium, Yugoslavia, Poland—ships from all these countries are fighting for the Allied cause in the Battle of the Seaways. And in these ships sail men of all these nations ; in fact, men of almost every nationality, race and creed, including many Swedish and Danish seamen.

In war, as in peace, Indian seamen form a large part of the British Mercantile Marine. Over 40,000 Indians, brave men

and splendid seamen, are at present serving in British ships, forming, indeed, about a quarter of the total strength of the British Merchant Navy. On British ships, too, sail Chinese, Malayans, Arabs, and also men from almost every European country and from all parts of the British Empire.

Dangers shared and the common hatred of the evil things against which the Allied Mercantile Marine is fighting have bred a great sense of comradeship among them. Many stories of their heroism are told—stories of seamen who refused to abandon comrades or duty in the face of mortal danger—of men whose last living actions showed dauntless self-sacrifice.

And gradually, out of the turmoil and the horror of war at sea, have emerged a new dignity and a new status for merchant seamen. Britain now officially recognises



Above : The men of the Merchant Navy wear no uniform ; only the small, silver badge reproduced here—the symbol of great steadfastness, courage and fortitude.

Left : The smile with which the Merchant Navy greets danger. In this war, this British seaman has been blown up seven times ; five times his ship has been sunk beneath him. Never for one moment has he entertained the idea of leaving the sea.



Above : These seamen were bombed and machine-gunned almost continuously for six days and six nights—yet they came through safely with their vital cargoes and said that they were anxious to be off again as soon as possible.

Below : Living space is cramped aboard the smaller ships—but sailors are past-masters in the art of making good use of small space.





Left : Ready for anything—a cheerful Dutch seaman, now serving in the British Merchant Navy.

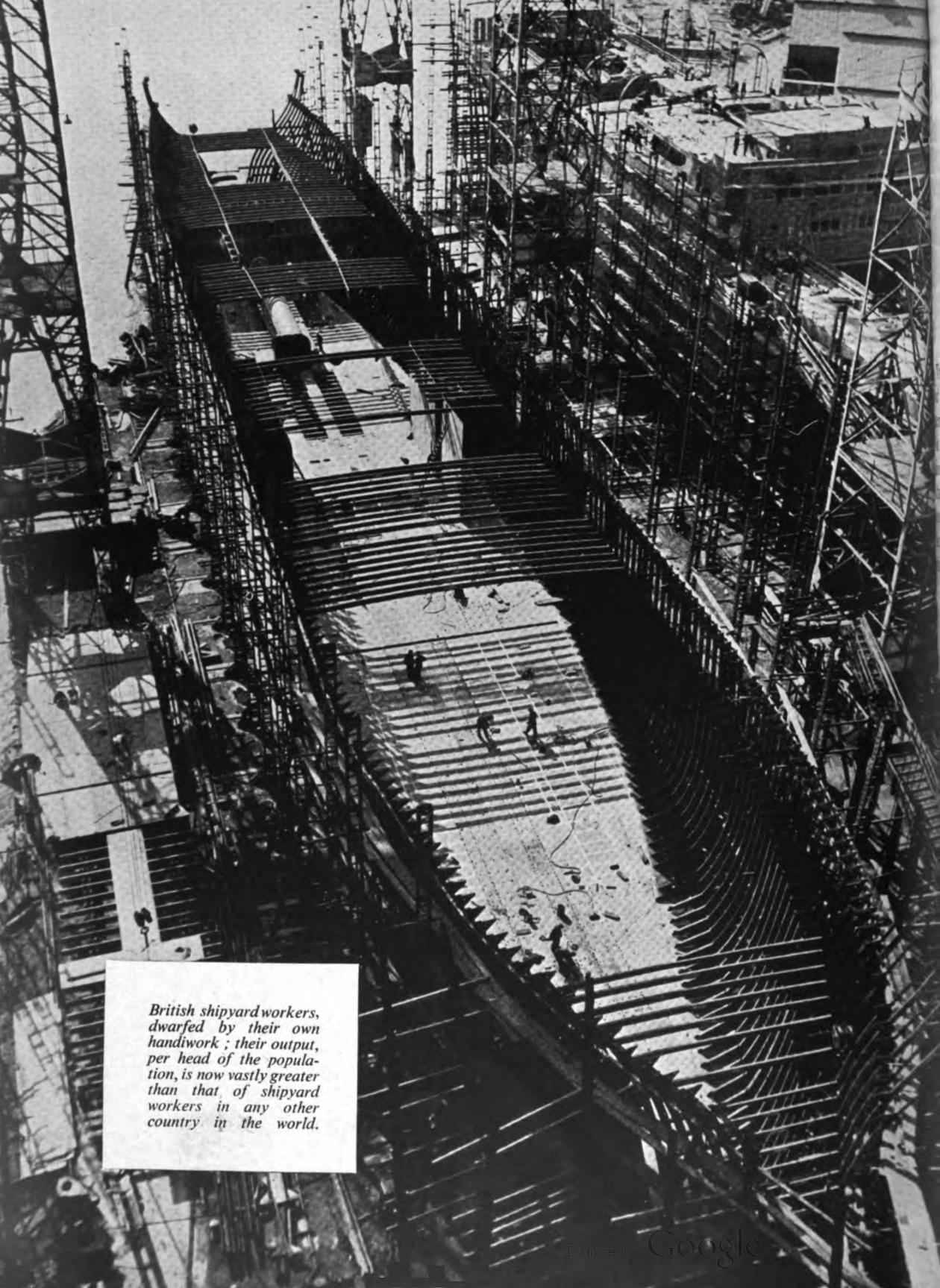
Right, top : A game of cards between watches in a merchant ship.

Right, below : Men serving with the British Merchant Navy now have their own well-furnished clubs, where they can rest and talk in comfort, amuse themselves, and obtain good meals at moderate prices.

that these men rank with the fighting forces, and looks after their welfare and amusement—both at sea and ashore—accordingly. Well-stocked canteens and comfortable clubs are provided for them. Seamen of almost every nation have their own clubs in various seaports where they can meet and talk with their own countrymen. They are supplied with books, comforts and warm clothes which help to make easier the conditions under which they work. Financially, they are better off than they were at the outbreak of war. The pre-war system of "paying-off"

at the end of each trip has now been abolished, and in its place has been established a system of continuous employment, so that there is no waiting between ships without pay. While at sea, officers and men receive War Risk money, which, in the case of Able Seamen, increases their pay very considerably. Finally, all merchant seamen (or their relatives) are now entitled, if disabled or killed, to pensions at rates comparable with those applicable to men of the Royal Navy.





British shipyard workers, dwarfed by their own handiwork ; their output, per head of the population, is now vastly greater than that of shipyard workers in any other country in the world.



SHIPBUILDING AND MAINTENANCE

The men who sail in Britain's convoys—and the men and women who organise them—are doing a splendid job of work. But it is a job which could not be maintained for more than a few months, a job which could never have reached its present level of efficiency, without the efforts of thousands of workers in the docks and shipyards of Britain and the Empire.

Victory in the Battle of the Seaways depends, ultimately, upon the rapid, efficient production of new ships and the maintenance and repair of old ones. Shipbuilding in Britain and the Empire has always been a highly specialised and intensely individualistic job, certain firms tending to produce certain types of ship only. A shipyard which had concen-

Draughtsmen at work on the blue-prints for a new merchant ship. Improvements in design and performance are constantly being made, and many building processes have been speeded and simplified.



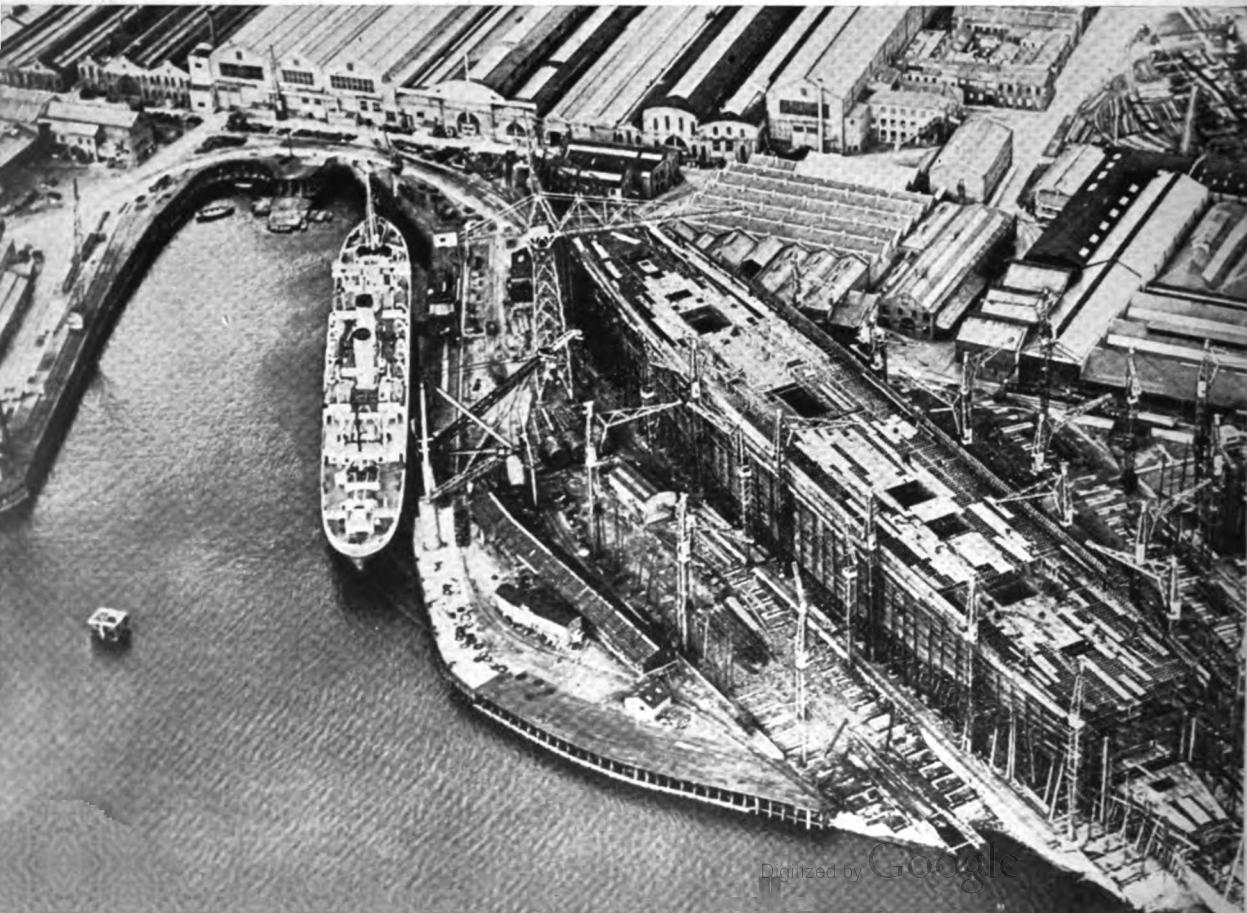
trated exclusively on the production of tankers, for example, would find great difficulty in adjusting itself to the efficient and economical production of general cargo coasters.

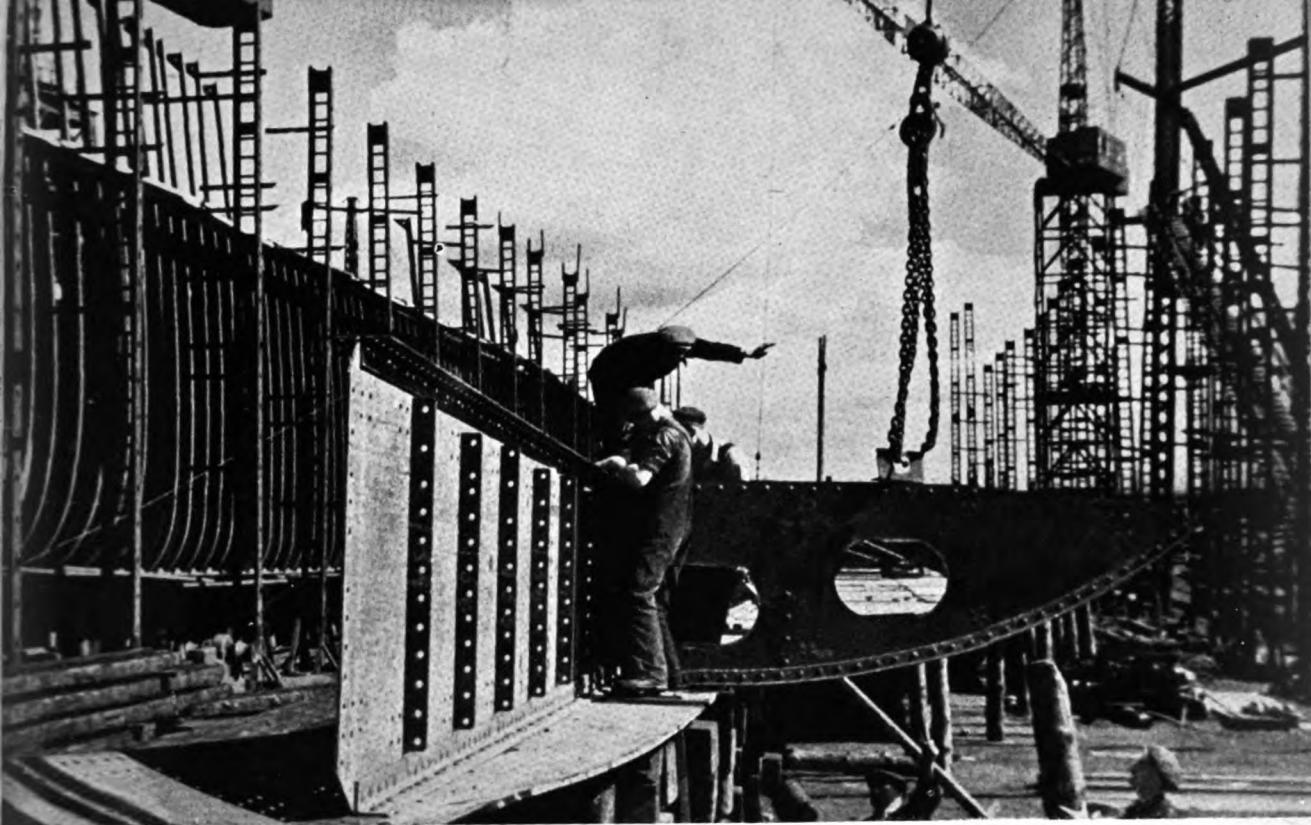
Yet somehow, the shipbuilding industry, still intensely traditional and localised, has been placed upon what is almost a mass production basis. Just as ship-owners—always extremely independent—realised, when the convoy system was adopted, that the time for independence had for the moment gone, so the big shipbuilding firms, realising the absolute interdependence of the nation's resources in war time, pooled their yards, their materials and their skilled workers wherever necessary.

Britain is now turning out very large numbers of ships each year. Every one of these ships, though shorn of peace-time trimmings, is built to the high standards of excellence set by British craftsmanship and British labour. British women are working in the shipyards in their thousands, performing many and various tasks, from crane-driving to riveting, side by side with the men. Thanks to their hard, determined work, coupled with drastic mobilisation of the nation's wealth, the output of Britain's shipyards is greater per head of the population than that of any other nation in the world.

In addition to this, large building programmes have been undertaken in the

An aerial view of a Clydebank shipyard. A 9,000-tonner is lying in the fitting-out basin.





Above : Giant cranes at work in a busy shipyard.

Below : Completing the keel of a new vessel.



shipyards of the British Empire. Small naval vessels are being produced in larger quantities than are merchant ships, but Australia is building "refrigerated cargo" steamers, as well as doing extensive repair work, while in Canada one 10,000-ton ship was being launched every four days by June 1942. South Africa had, by December 1941, a thousand times as many shipyard workers on the job as she had at the outbreak of war. Repair work is also going on in New Zealand shipyards. India has concentrated chiefly upon the vital work of rebuilding and repairing, and upon making the great quantities of "degaussing" cable required to protect merchant shipping from the magnetic mine. Since the outbreak of war, over 4,000 sea-going ships have been repaired in Indian yards.

It is useless to build ships which are fast at sea if they are long delayed in port. Cargo must be handled quickly

and transported from hold to railway or warehouse (and vice versa) in the minimum number of operations. In recent years increasing attention has been paid to the efficiency of dockside appliances. In most of the larger docks from which coal is exported, railroads run right down to the quayside. As each coal truck comes to rest, it is caught by an automatic lifting device which, raising it high over the ship's hold, tilts it bodily and empties out its contents.

Grain is loaded by enormous chutes, and unloaded in a manner similar to the liquid cargo of a tanker, by suction through enormous pipes which take the grain directly into waiting railway trucks. Direct from the quayside, it may go to the other end of Britain without being reloaded.

Electric cranes—some of them capable of performing, at the pressure of a button,

Fitting a huge propeller to a British merchant ship.



Just one of the thousands of jobs which come into British repair yards. Soon, this badly holed ship will be back in service again.



almost anything that could be done by an enormous human hand—are used for unloading packing-cases, other containers, and frozen meat. Huge floating cranes capable of lifting and carrying weights up to 100 tons over long distances are used for shifting particularly heavy cargoes. To-day, these cranes are working especially hard, loading and unloading the tanks, armoured vehicles and huge machine parts which Britain is sending overseas in such large quantities.

These devices and many more are speeding Britain's war effort, as they speed her convoys. Into large and small

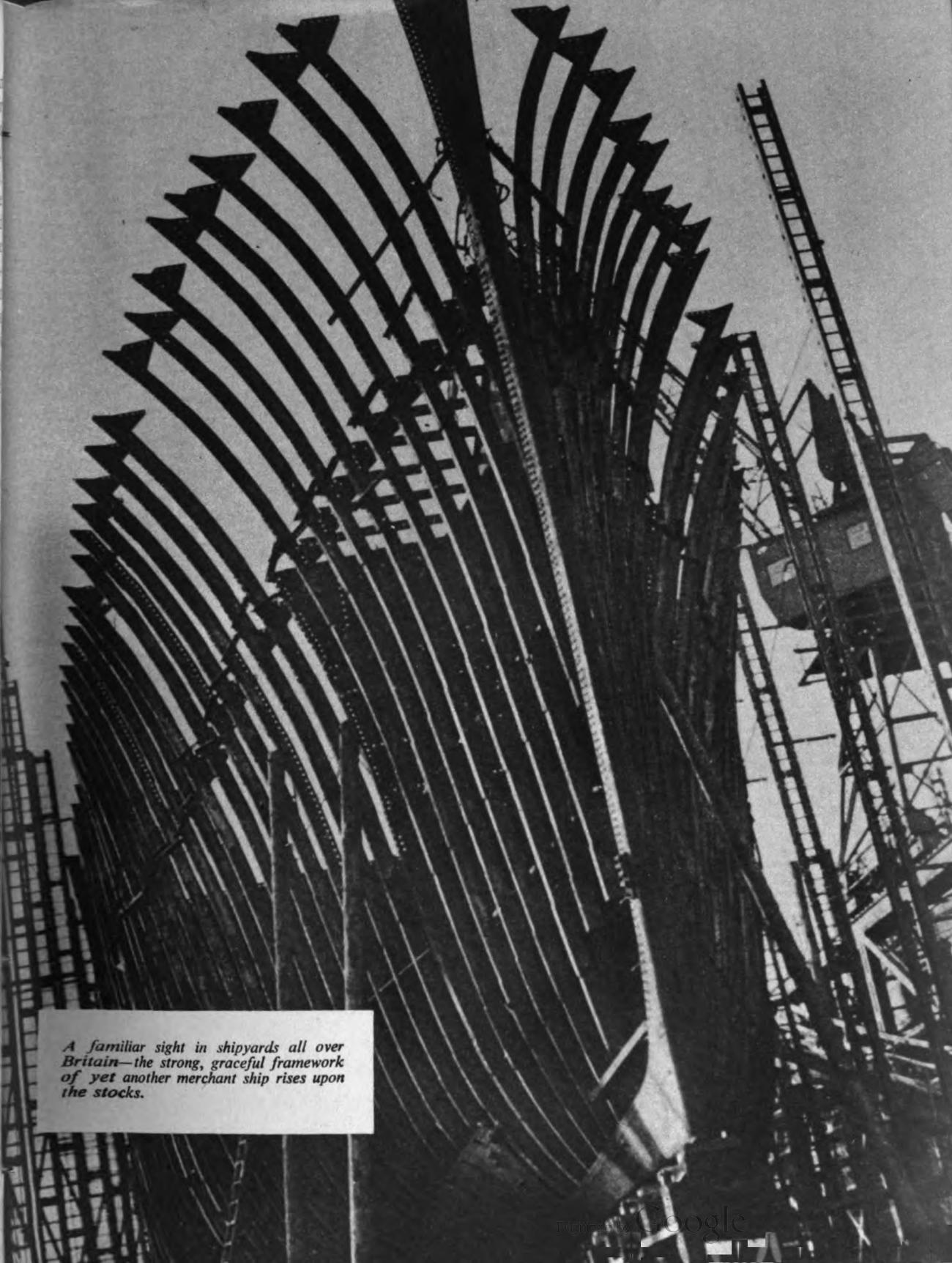
ports all over Britain the ships come in an unending procession to unload their vital cargoes. After a few days—sometimes a few hours—they are ready, once again, for the struggle. And, come what may, until that struggle has been won and the seas cleared, Britain will build more and more ships, produce more and more sailors to man them. For only by conquering the U-boat menace, and all that it represents, can the United Nations ensure a future in which the world's seaways will be open to merchant ships of every nationality, sailing unmolested upon their lawful occasions.

Oxy-acetylene welding plays an important part in shipbuilding.



A giant driller at work on a steel plate which will form part of a merchant vessel's hull.





A familiar sight in shipyards all over Britain—the strong, graceful framework of yet another merchant ship rises upon the stocks.



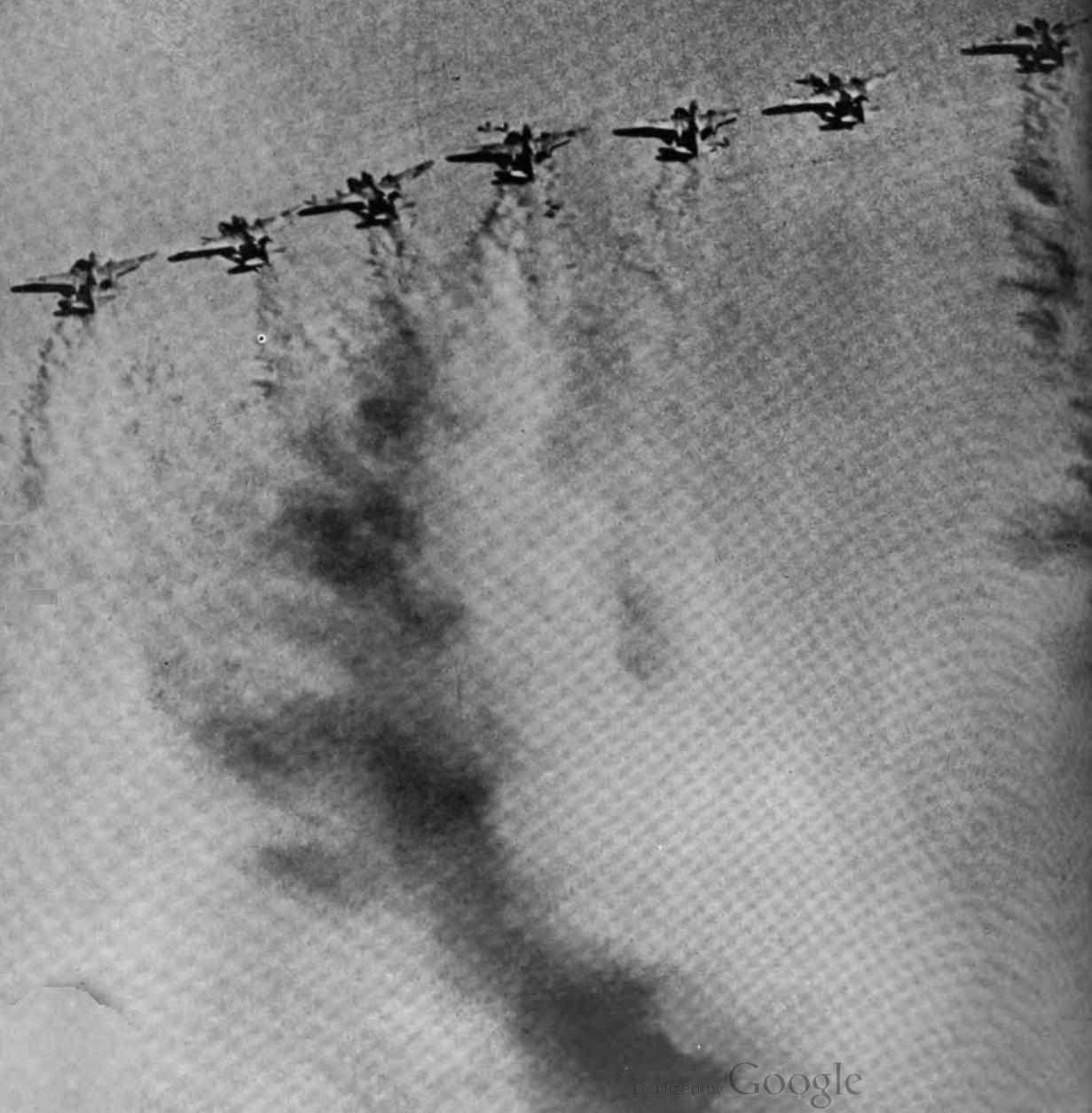
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THE OFFICIAL STORY OF AIR OPERATIONS, FEB. 1942—JAN. 1943







R.A.F.

MIDDLE EAST

The Official Story of Air Operations
in the Middle East, from February 1942
to January 1943.

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SIDI BARRANI: R.A.F. GROUND CREWS

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THERE ARE MANY MEN AND WOMEN IN THE FORCES WHO WOULD WELCOME A CHANCE OF



R.A.F. GROUND CREWS: TRIPOLITANIA

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I. PATTERN OF AIR POWER

I—Something New in the Middle East

ABOVE 35,000 feet without a pressure cabin a man struggles to remain conscious even with the help of oxygen. He can suffer not only from intense cold but also from temporary paralysis of the limbs, expanding gases which distend the intestines, and sometimes from "the bends," an affliction which deep-sea divers can also know, in which all the joints of the body are gripped in a pain said to be more intense than any other. Great height also has a temporary effect on a man's mind, plunging him into despondency against his will.

On August 24th, 1942, Flying Officer G.W.H. Reynolds, D.F.C., flying a Spitfire which had been modified and stripped of most things save its guns, sighted a Ju.86 reconnaissance aircraft with two men sitting securely in a pressure cabin in the nose, just north of Cairo. He pursued it towards Alexandria and then out to sea at an ever-increasing height. At 37,000 feet he almost reached it and began to zig-zag back and forth just below in order not to overshoot. The Ju.86 zig-zagged in the same way, trying to stay just above the Spitfire and force it to lose a little height on each turn. The long, slow duel in the rarefied atmosphere proceeded in this manner until Reynolds was at a height of 40,000 feet. He realised that he could not get any higher until he had used some more petrol to lighten his aircraft. He started to calculate how much petrol he could use and how far out to sea he could go before he would be forced to turn back in order to reach home safely, for he had abandoned his Mae West life-saving jacket and his dinghy to save weight, keeping only a parachute. In the middle of these calculations he temporarily blacked out, having just sufficient time to turn his oxygen tap to "full emergency" to bring himself round again. He then slowly forced the

Spitfire higher still. At 42,000 feet he was practically level with the Ju.86, slowly closing. At a range of 50 yards he opened fire. Flame and grey smoke whipped backwards from the starboard engine of the enemy, which banked sharply to the left. Reynolds had intended to follow but his Spitfire began not to function properly and he fell nearly 10,000 feet very quickly. The pilot's own physical endurance was practically exhausted.

"I had been experiencing great pain at that height," he said, "as I was over 40,000 feet for nearly half an hour and felt rather ill. Added to this, my petrol and oxygen were low and I wished to get home as quickly as possible. I landed at base with five gallons of petrol left."

He did not know when he landed whether or not he had destroyed the Ju.86, but its loss was afterwards confirmed. The first stratosphere reconnaissance aircraft had been shot down.

The destruction of this Ju.86 was the first success in a struggle between the German stratosphere reconnaissance of Egypt—the only daylight activity over that country that the Luftwaffe usually dared attempt—and a small group of test pilots and engineers of the R.A.F. who maintained that these high-flying Germans, inaccessible to any other weapon, could be reached and destroyed by a modified Spitfire even in the hot skies of that part of the world.

The pilots who undertook this task were not young men. Reynolds, who destroyed the first Ju.86, was a man approaching 40 years of age, yet he flew above 40,000 feet some 25 times within a month. His first success came only after much trial and endurance, but the three other Ju.86 aircraft which the Germans possessed for this work of reconnaissance were soon to be destroyed as the first had been.

R.A.F. Middle East creates a new kind of air power, trained in co-operation with land and sea forces, flexible for attack or defence, designed to control the air over North Africa and the Mediterranean.

The enemy came, however, at always greater and greater heights; the last one was pursued to nearly 50,000 feet. This fell also to Reynolds, who had been for more than an hour higher than 45,000 feet. His whole cockpit, instrument panel, control column, perspex, were coated thickly with ice. His body was wrenched with pain, his arms were temporarily paralysed and his eyesight for the moment almost failed with weakness. When he met the Ju.86 at a distance of only 100 yards but at a height of 50,000 feet, he was physically incapable of firing his guns; the enemy turned and fled towards the sea. Reynolds manœuvred his Spitfire to follow it by moving the position of his body in the delicately-balanced aircraft. He caught the Junkers once more, far out over the Mediterranean, and managed to move his hands sufficiently to press the firing button. The Ju.86 was destroyed. The Spitfire completed much of the journey back to base in a powerless glide.

When the pilot started to glide home on that flight he glanced round and below him at a remarkable panorama. He could see the whole of the eastern Mediterranean spread out like a map beneath him. To the west, in the fine clear air of this part of the world, he could see past Benghazi into the Gulf of Sirte; to the east, the coastline of Palestine and Syria with the mountains beyond. Behind him lay unrolled the island-sprinkled Ægean. In front lay Egypt revealed at one glance from the coast to beyond Cairo, and the length of the Suez Canal from Port Said to Suez.

At that moment the pilot might have reflected, though doubtless he had much else to occupy his thoughts, that, over all that territory he could survey and indeed for many hundreds of miles beyond even so remarkable a vision, the Service of which he was a member had established by

the spring of 1942 a true air power. It was organised to fight in equal partnership with the naval forces on the sea beneath him and with the army on the land ahead. But chiefly it had learnt to seize command in the third dimension of all that body of air which drifted around and beneath him, the air of the Mediterranean and the Middle East, never more comprehensively surveyed than by him at that moment. That was the intangible territory which the R.A.F. and its allied squadrons were then prepared to occupy and hold against all disputants. Its boundaries were limited only by the amount of petrol in an aircraft's tanks. From within those boundaries the squadrons were preparing to strike at the enemy in air, on land, on sea and beneath the sea. The test was to come in the late spring of 1942.

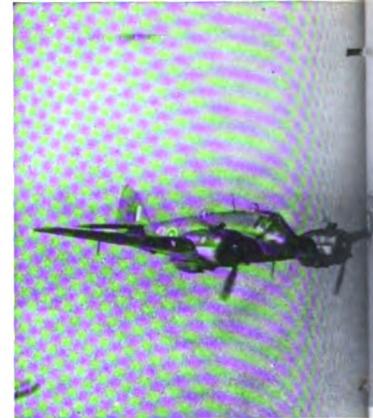
Since the entry of Italy on June 10th, 1940, there had been continual war in that area of the world, roughly one-third larger than the United States of America, which is called "the Middle East"—a military territory, not that formerly so named by geographers and diplomats. Its operational boundaries had indeed varied a great deal, stretching at different times from the western wadis of the Libyan desert to the left hand of the Red Army in Persia, from the snow mountains of the Balkans to the Central African jungles. Some of it, the Libyan desert, had twice already been conquered from the enemy, and twice lost again in part. Tiny British forces had been driven from the northern areas of Greece and Crete; boldness and endurance in the face of great odds had held the island of Malta and extended Allied control from the eastern shores of the Mediterranean at Syria and Palestine to the great expanse of Iraq and Persia. A series of seeming miracles had wiped out one large Italian Air Force and Army in Cyrenaica, an-



The war in the Middle East was a struggle for airfields. So long as our main air force was based in Egypt, shipping convoys successfully and in reasonable safety to Malta. (Aircraft ranges vary widely with conditions.)



wide stretches of the Mediterranean were beyond our fighter control; with fighters at Benina, we could sail
 in the circles represent rough operational limits for the single-engined fighters and the Beaufighters during this period.)



The strong limbs of Air Power. *The Desert Force*, of fighters and light bombers, watched over our shipping and struck at sea. The centre picture shows Beaufighters. *The Bomber Force*

other in East Africa and Abyssinia where the Emperor had been reinstated. By hard fighting a place had been kept in the battle of the Mediterranean, and control of the Red Sea had been wholly established.

The air above all this territory, ranging between the extremes of temperature and weather, ice to coat an instrument panel, sun heat to blister a bare hand, dust storms to blot out land and sky, electric storms to dance in blue fire on wing-tips, had been, and continued to be, the battlefield of the Middle East Command of the Royal Air Force. This Command has existed almost as long as the military use of aircraft. Headquarters, R.A.F., Middle East, were set up in Cairo in 1915 to control the air war over the Mediterranean and Red Seas, and the countries of their shores. When peace came after the first world war, R.A.F., Middle East, remained, its area of control diminished, but still a permanent garrison of the air. So that it was something more than the tradition of a name which entered the present war; it was a Command in being.

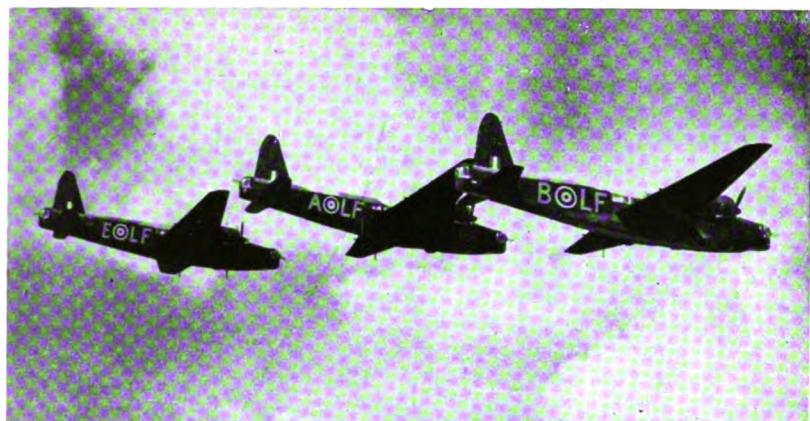
Into this organisation and under this name units of other air forces had been added during the course of the war. When Italy declared herself against us, the bulk of the squadrons of the Middle East were, and have remained, those of the R.A.F. manned from the British Isles. Even in those early days, however, they were strengthened by squadrons of the Royal Australian Air Force, the South African Air Force and a noted squadron from Southern Rhodesia; men of the Royal Canadian Air Force and of the Royal New Zealand and Royal Australian Air Forces were

posted in large numbers to the British squadrons, and later came complete Canadian squadrons; as the war progressed they were to receive squadrons of the Fighting French Air Force, the Royal Hellenic Air Force and the Royal Yugoslav Air Force; it was not long before men of the air forces of most of the United Nations were numerous comrades in their tents. Later whole formations of the United States Army Air Force flew in to work beside them. The old name remained—R.A.F., Middle East—but it must always be read in the sense of a powerful air force of the United Nations, an international air force, working as an harmonious team under the operational control of the R.A.F.

It had not always been powerful. In June, 1940, the Air Officer Commanding-in-Chief, Air Chief Marshal Sir Arthur Longmore, K.C.B., D.S.O., faced almost impossible odds with a handful of squadrons flying into battle in obsolescent aircraft; nevertheless, on most occasions they held the enemy out of the air. The difficulties of reinforcing and supplying the Middle East over a sea route 14,000 miles long, at a time when Britain herself needed every aircraft that would fly, do not require emphasis. By the spring of 1942, however, a formidable air weapon had been built in the Middle East, and had been trained to a theory and a plan.

It must be made clear for what purpose this power was created, what was the object of the whole war in the Middle East, what was to be gained by victory or lost in defeat.

The first prize of the war was a shipping route, running from Gibraltar through the Medi-



the enemy and kept his head down. On the left are Kittyhawks. *The Coastal Force* reconnoitred, attacked the enemy's supply ports and bases. On the right are Wellingtons, long-range night-bombers.

eanian Sea and the Suez Canal, out through the Red Sea into the Indian Ocean. This route has often been called the lifeline of the British Commonwealth of Nations. The Italian declaration of war in itself virtually denied that route to Britain, not by merit of the Italian Fleet, but because the Mediterranean is a sufficiently narrow sea to be controlled throughout its length by aircraft based on its shores. Whoever stocked the shore airfields with bombers and fighters could pass his own ships through the sea with reasonable safety, and destroy most of the enemy ships that attempted the same route.

By how much would it benefit the Allied war strength as a whole if the Suez Canal route could be reopened to its shipping? By this much. The supply ships and warships destined for the Middle or the Far East, no longer compelled to make the weary journey round the Cape of Good Hope, would save so much time that for the same result only a small proportion of their numbers would be needed. The rest would be available for use in the war elsewhere. It would be the equivalent of presenting the Allies with vast new war and merchant navies. It would be as if all the shipyards of Britain and America produced double their maximum number of new ships for a period of months; or as if all the ships sunk by the U-boat packs for many months were miraculously restored to the surface ready for use again anywhere in the world. It would mean the swifter disposal of stronger Allied armies at any theatre in the global war.

That happy result could be gained only by securing air control of at least the southern and

eastern shores and waters of the Mediterranean and by erasing enemy air power in East Africa. In securing that air control, there was always one limiting factor, the distance that an aircraft can fly before it must alight to refuel its petrol tanks. As long as our main air force was based in Egypt, for instance, there were wide stretches of the Mediterranean over which we could exercise no air control at all, simply because our aircraft, particularly our fighters, could not reach them. Directly the airfields of Libya were captured, important stretches of the Mediterranean were at once covered by our air umbrella and became safe for our shipping. To give a practical instance, every time our fighters could use the airfield at Benina just outside Benghazi, we could sail shipping convoys successfully and in reasonable safety to Malta; whenever the enemy held that airfield, ships ran to Malta if at all, only at great peril and with terrible losses.

The first aim was to possess so many airfields that the whole length of the Mediterranean could be controlled and the lifeline shipping route reopened. That is what the Middle East war was about during the period covered by this account; that is why it was a battle for airfields. Infantrymen scaling the rock peaks of Abyssinia, tank crews battling across the Libyan desert, submarine commanders sighting their periscopes off the coast of Italy, observers adjusting bomb sights over Benghazi harbour, gunners on the wharves of besieged Malta, fighter pilots scrambling into the desert air, all these alike and thousands more fought in the same battle, the battle for airfields. All three Services of sea,

and air took a great part in this battle; the scantiest story of all their deeds would scarcely cram into many volumes. Nothing so ambitious is attempted here; this is an account of only part of the war—that fought in the air. The only references made to what was happening at the same time on the sea and land are those which are essential if we are to understand what was also happening in the air. Sea and land have equally great chronicles, but this is the story only of the air.

Yet, touched in by reference to the sea and the land as though to a map or timetable, the air itself makes a complete story. The air has its own campaigns, its own battles. The air war which developed over the barren desert, the blue sea of the Middle East, was a new kind of war, a pattern and a prophecy perhaps of war in the future. By the spring of 1942, there was something new in the Middle East; there was air power. Instead of a few squadrons, reinforced by every kind of improvisation and thrown into battle where the need was most, Cairo then controlled a unified air force welded together into a single striking power. There was much re-organisation still to be done, many sad gaps still to be filled, but the pattern and the idea were both there. A true air power had been created to work in collaboration with land power and sea power. The enemy had nothing like it. They had fleets of bombers to supplement the German artillery or extend the gun-range of the Japanese fleet, but air power they did not understand. R.A.F., Middle East, became far more than anything they had conceived. It became in the air what an army is on the ground or a navy at sea—a force fighting in its own element, striking with its comrade Services at the common enemy.

To dissect the whole body of R.A.F., Middle East, as it was in the spring of 1942 would reveal even now too much, since the war is not yet over. But something may be said of its organisation.

Headquarters were housed in an island of tall buildings in Cairo barbed around with wire, outside which chattered and bustled the variegated street life of Egypt—an occasional camel or a cow lumbering ponderously through the stream of limousines and dispatch riders on motor-bicycles, street vendors squatting against the wall to hawk wicker baskets of oranges, a man in a ragged galabieh proferring long purple strips of sugar-cane, black-robed women crowded on a flat cart drawn by a donkey. Behind the wire stood the many offices and the silent control rooms of the headquarters, with as varied a task

and responsibility as the Air Ministry in London which it much resembled.

There Air Marshal, afterwards Air Chief Marshal, Sir Arthur W. Tedder, G.C.B., who had succeeded to the command in May 1941, planned his moves, nurtured the strength of an air power which he was busily accumulating in spite of the daily drain of a battle which never stopped; there his deputy, afterwards knighted as Air Marshal Sir Peter Drummond, K.C.B., D.S.O., O.B.E., M.C., and his chiefs of staff, men of long experience in this highly technical business of an air force, worked at its multitudinous detail. Air Chief Marshal Tedder and Air Marshal Drummond remained at the head of R.A.F., Middle East, throughout almost the whole period covered by this account. In the last days, the command passed to Air Chief Marshal Sir Sholto Douglas, K.C.B., M.C., D.F.C.

From Cairo, that two-cities-in-one of luxury and poverty, the arteries of air power branched into many strong limbs. The force in the Western Desert warded off the enemy and kept his head down. The bomber force based on the Suez Canal area struck at the strategic targets of supply ports, naval bases, submarine depots. A force of coastal aircraft based on Alexandria on the one hand and Malta on the other watched over our own shipping and attacked that of the enemy. Day and night fighters guarded the skies of Egypt itself.

These were the main strong limbs. There were many smaller but equally necessary—fighter squadrons that waited in protection of more remote domains, bomber crews who daily searched for submarines in the heat over such waters as the Persian Gulf, ferry pilots who brought convoys of reinforcement aircraft across the jungle from West Africa, an air-sea rescue service, men of the big training schools in East Africa and many more.

Nor should it be forgotten that in all those places where aircraft flew, and many where they did not, a vast company of men of the R.A.F. worked on the ground. They operated the signals, repaired the aircraft, housed the stores, tended the sick and wounded, checked the accounts—clerks, cooks, truck drivers, refuellers, armourers, chemists, photographers and just plain aircrafthands with no particular trade who tackle any job that is going and shyly admit to being the backbone of the Air Force. All these and their comrades worked with the same thought as the air crews, to keep the Air Force flying.



The hot sun streams down on a desert landing ground. A Boston, trim and perky, has returned from a raid; four quick, cheerful South Africans come in to report. The Desert Air Force is in action.

2—Airman's Desert

WESTWARDS FROM the startling greenness of the irrigated strip on either side of the river Nile runs a vast desert of varying character, uninhabited save by nomad Arabs living in "villages" of tattered tents, herding camels, studying the waterholes on which their lives depend. To the south-east this desert runs down into the Sudan, to the south-west it links with the Sahara. Here and there along its northern coast are pockets of cultivation out of which the Italians wrought their empire, settling colonists in well-designed community buildings around which were scattered the farms. The largest of these pockets, called the Jebel Akdar, lies in the hump of land to the east of Benghazi, con-

siderable enough to nurture half a dozen towns, the settlements of the Italian colonists, and one big city. Not again is such fertile country reached until the oasis of Tripoli.

The area of those parts of this great desert which lie within the boundaries of Egypt and Libya is roughly equivalent to that of India, but it is with no such vastness that this account must deal. The fighting has nearly all been done in a comparatively narrow coastal strip running from Alexandria in the east to Tripoli in the west, a distance about equal to that between Moscow and Berlin; it is to this coastal strip that the name "Western Desert" refers.

The airmen lived nomadically in the desert, as

the Bedouins do. There were no tarmac runways, no hangars, no neat headquarters buildings or barracks, no control tower, no concreted petrol stores—the desert airfield was nothing but a large space of desert scraped smooth and hard, around the edges of which were scattered a few tents and trucks, the aircraft and the protective R.A.F. armoured cars. The large square marquees, called E.P.I.P. (European personnel Indian pattern) tents housed the various messes, the operations control, the orderly room. Around them were dispersed ridge tents and waist-high bivouacs as sleeping quarters, each with its V-shaped slit trench handy as an air-raid shelter. The rest of the show stood on wheels. The office of the commanding officer was a caravan trailer. Signals, that lifeblood of the whole force, operated from a few specially-fitted vehicles beneath portable aerial masts. The workshops of the engineers were fitted into lorries. The cookhouse itself was often a trailer with a field kitchen dumped outside. The whole camp, tents and all, could be bundled into trucks and be on its way within an hour.

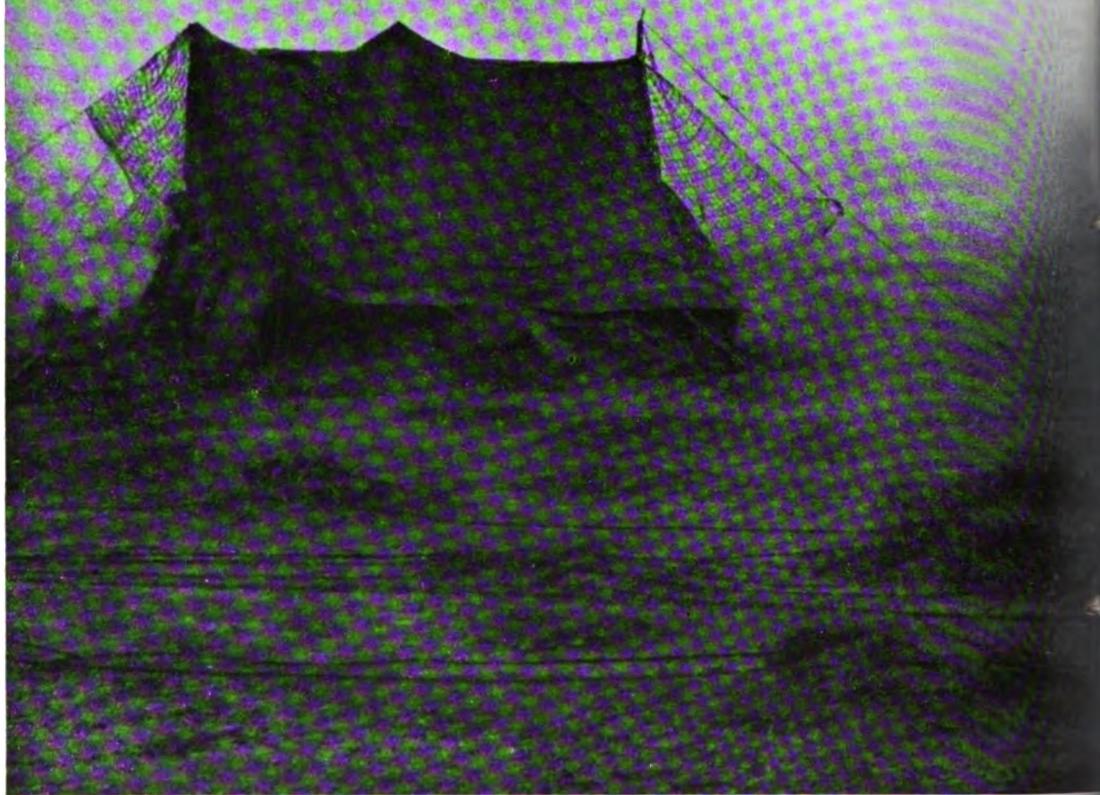
The men who dwelt on these desert airfields were not dressed in the blue uniform of the R.A.F. In summer the universal clothes were khaki shorts and shirt with an R.A.F. cap, for topees were rarely necessary even in the fiercest heat. In winter the uniform was khaki battle-dress augmented by every sweater and jersey on which the wearer could lay hands, so cold were the nights. In summer it was extremely hot and fly-plagued by day, but the cool of the evening was perfect, the nights silent and splendid under the brightest dome of stars, and a big, round, almost day-bright moon which lost a little of its fascination since at its height and on its wane the landing grounds were regularly bombed. In winter the days were usually bright but the nights bitter, and sometimes there were torrential rains which bog down an aircraft, and turn each rutted track into a morass through which the truck drivers flounder and curse.

The chief torment of the desert was the dust storms. They blew more frequently with the khamsin of the spring, a hot wind from the south with the strength to rip down a tent. Their density was that of a London fog in which every particle was grit. Under the pall of a desert dust storm the whole area darkened into half-night. A man driving a car could not see its bonnet, two men sitting in a creaking and





Desert day, desert night. In summer, too little water; in winter, sometimes too much. Summer nights were silent and splendid, but men slept like hunters, ready for action. Always there was the menace of dust storms, driven by hot or bitter winds, hours of unabated, gritty misery. *But the life was simple and healthy.*

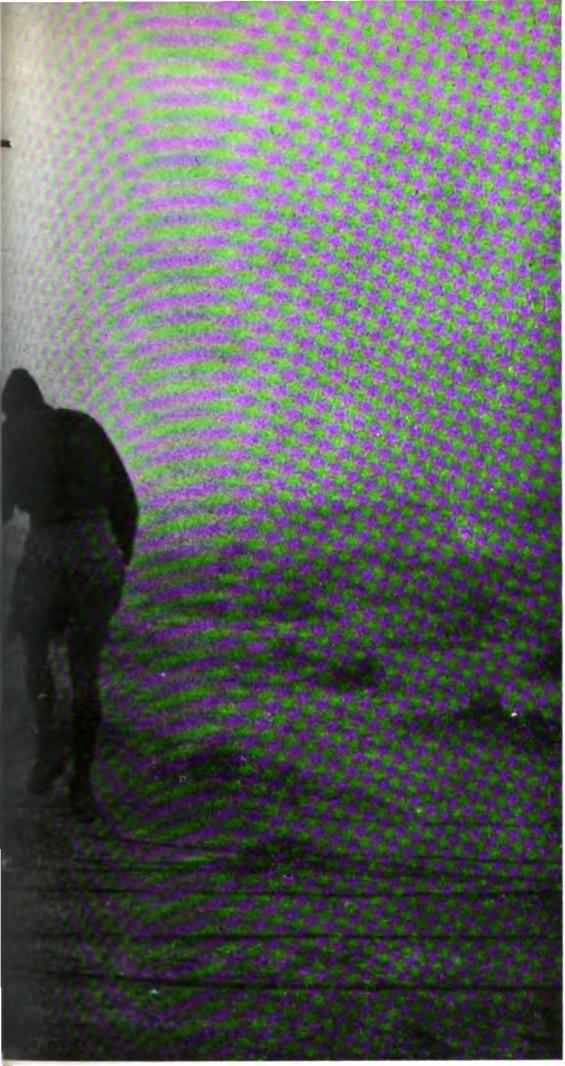


The chief torment of the desert was the dust storms, thick as a London fog, which ripped down tents, covered everything with grit, and made flying impossible.

straining tent could barely discern each other across its width. The dust storm might last for hours of unabated, gritty misery, and, of course all flying was impossible.

That is perhaps too unpleasant a picture of desert life, for there were compensations. For one thing it was extremely healthy; with the exception of desert sores—any small cuts that fester for months when sand filters into them—there was almost no sickness there. Life was simple and the hours of sleep long. The food might be only bully-beef for weeks on end, though usually there was some garnish, but it sufficed. There was nearly always enough water for a cup of chlorinated tea and even for a bath

when one had learnt to bathe in a tin drinking mug. There were also the pleasures of contrast; to arrive at the palm trees of the coastal wadi of Maaten Bagush after bumping all day over dust and hillock, and there to strip and swim in the warm blue sea, was a pleasure that had few comparisons. The pilots would think it sentimental to speak of the comradeship of these desert camps, but in every squadron this was most marked. There were few who returned from the desert without some memory of a circle of men squatting outside a tent under the moon, one perhaps playing a violin or a mouth organ, the rest singing—"There was a Monk of Great Renown," "She'll be coming down the moun-



miles from the coast, there is scant hope, unless a man be sufficiently lucky to fall in with a wandering Arab tribesman or a small camel caravan

Remarkable of the desert air war is not how many airmen lost their lives by landing many miles from help, but rather how many of them in such circumstances contrived with great courage and endurance to walk back to their squadrons often piercing the enemy lines in order to do so

Somewhere in the Western Desert in June 1941 a few officers founded a club which they named the "Late Arrivals Club," for entry to which there was only one qualification. No man could become a member unless, in the words of the club rules, "when obliged to abandon his aircraft, on the ground or in the air, as a result of unfriendly action by the enemy, he succeeded in returning to his squadron, on foot or by other means, long after his Estimated Time of Arrival. It is never too late to come back." Members of the Late Arrivals Club wear a small emblem of a winged flying boot on the left breast of their flying suits. In October 1942, when, as will appear later in this narrative, nearly the whole of the Western Desert had been conquered by the enemy, a man had many hundreds of miles to walk in any attempt to regain our own lines. A Wellington bomber circling Tobruk harbour at nearly 3 o'clock one morning was so damaged that it could not be flown home. One engine caught fire and the propeller came off. The six men of the crew baled out and four of them, a flight sergeant and three sergeants, assembled by the wreck of their aircraft; what happened to the other two they did not know. They counted their possessions at dawn—three full waterbottles, six tins of bully, 16 packets of biscuits, milk tablets, chewing gum and chocolate; with a little toffee, some benzedrine tablets and some matches; and four small compasses. Even in a straight line (and they had to cut south to avoid capture) there were more than 300 miles of desert between them and the British front positions.

That first day they walked from dawn until 4 o'clock in the afternoon, stopping only at a cairn filled with rainwater from which they drank and filled a two-gallon can they found nearby. That night each man supped on two milk tablets and all slept well, although two of them had slight injuries to their legs as a result of parachute landing

tain," "Shaibah Blues," all that mixture of sentiment and ribaldry which is the folk-music of the Air Force.

Never think, though, that the pilots and air crews knew only the desert of encampments, or even the vast expanse of openness moving eternally beneath their wings. Deserts have always been associated with one particular peril, that of being stranded in their midst without sufficient food or water. It was a peril to which pilots and air crews were especially exposed. Flying a damaged aircraft over inhabited country, the pilot can make a crash-landing or bale out, always with every hope of succour, even should he fall among foes. Over the desert, even 50

The rest of the story is best told in extracts from a diary which two of the men kept :—

“Second day. Set course south-east. Found water hole, had a good drink. At midday, rest and ate a can of bully. More water, had a good drink. 1800 hours, made camp by water hole. Six Hindus escaped from Tobruk came up to camp, well provisioned and plenty of water. Gave them compass. They said they were heading south into the desert. Sgt. A. was weak, his ankle giving him trouble.

“Fourth day. Drank out of tin and ate some milk tablets. Two Ju.88s passed overhead, very close and low, took cover. Sighted barbed wire ahead. 1030 hours, crossed border line south of Sollum, heat terrific. Sheltered from sun beneath an u/s* lorry. Found one bottle three parts full of brackish water, drank same. B.’s birthday party, had first good laugh. We had previously intended to try and walk through the whole night, but Sgt. A. was very weak, had bad ankle. Sgt. C. also very weak and bad ankle, flying boots making it very hard to walk. Going was very hard, loose rocks, unable to get good footholds.

“Sixth day. (Having walked all the previous night) 0830 hours, made camp, sleep almost impossible. 1730 hours, broke camp, ate one can of chocolate, 16 biscuits, milk tablets. Set course due east. 2030 hours, arrived at an u/s German lorry with four cans of petrol inside same, no water. It was here Sgt. A. decided to leave us. He had been through hell since our starting, despite our efforts to help and assist him. He was wearing flying boots which gave him very little support whilst walking over loose rock. At every rest we made throughout the six days, he was with us. He used to fall down on all fours beside our leaky water can, and sucked what water had seeped out. It was horrible. He was very close to the coast, we could see patrolling planes flying east and west all day and were very close to the railroad. He gave us his mother’s address, also address of his girl-friend. He was very worried about them and anxious that they should be notified of his safety. We left him with two bottles of water and one can of chocolate and walked south-east. We walked all night, hard going.

“Eighth day. (N.B.—We here started walking at night. Date covers walking period). By this time we figure we are somewhere south of Sidi Barrani. Our next pinpoint will be the Mersa Matruh—Siwa Oasis road. Hope to reach same in two or three nights. 1700 hours, started walking, course slightly south of east. Since leaving Sgt. A. we have been heading east, worrying about Sgt. C., did not want to get too far away from the coast. 1800 hours, here Sgt. C. decided to leave us. Like Sgt. A. he has had a tough time since our starting, it was cruel, since leaving Sollum we have been walking on loose rock. Figuring him to be no more than a day to a day and a half from the coast we left him with a water can with two bottles of water in same, a tin of chocolate, a chocolate bar, some milk tablets and some gum. He was very game. He gave us his mother’s address and wanted us to notify her of his safety. We left him in the shelter of an u/s lorry.

“Between the two of us we now had left four tins of bully-beef, three tins of ration chocolate, about 16 biscuits, about 20 milk tablets, three full waterbottles, two empty same, our two-gallon tin about three parts full. Having reckoned on the trek taking us 20 days at the beginning and having already walked eight of same we rationed accordingly for the remainder. We tried to make a can of bully-beef last the two of us three days.

“Tenth day. Started walking, course south-east, hard going, rocks and sandstorm. Found old tomb, decided to remain all night, very fatigued, sandstorm intense. Ate a few biscuits, had a drink each and slept all night.

“Twelfth day. Met two Arabs driving camels to Siwa Oasis. They gave us about three pints of water and two handfuls of dates in exchange for 45 piastres (all the money we had). Also gave us a good drink and a smoke out of a pipe, home-grown tobacco. ‘Smoke’ floored us.

“Fourteenth day. Had a little rain shower. Managed to have a good drink out of a rock pool, not enough to collect. Sole falling off Sgt. D.’s shoe, had to fix. F/Sgt. B.’s boot also in miserable condition.

* “U/s” is the standard R.A.F abbreviation for “unserviceable.”

"Fifteenth day. Shoes repaired. We walked until 1100 hours, our shoes were giving us trouble, wire fixings cutting into our feet, decided to stop and rest, heat terrific, had a little to eat and drink, made shelter of brush. 0630 hours, made our way to the edge of the Qattara Depression. The country down below seemed to be excellent to walk upon as seen by us from the top, so we decided to make our way down the cliff-side, same was hard going, very steep and dangerous in parts, ruined shoes completely

"Sixteenth day. Decided to stay night at a date grove. No dates shoes giving trouble. Very weak, food and water getting low, tough going. Had a good sleep after a little to eat and drink

"Seventeenth day. Started walking, hard going, shoes giving trouble, very hot, salt marsh, fairly weak. The marsh was all dried up and we were walking over salt crags which in appearance resemble waves and were 18 to 24 inches high. Being unable to walk in between same we were compelled to walk along the top, stepping from one to another. It was very hot. The food and water were both getting low, but since starting we had always figured on having insufficient to last.

"Eighteenth day. We made camp at 0900 hours. Sleep was almost impossible, partly because of exhaustion and mostly because of the continual gnawing in our stomachs and the thoughts of food and cool drinks that we could not keep out of our minds. Towards dusk we met three Bedouin driving camels, who made us two rounds of bread six to seven inches in circumference, called 'grassa' and which, although they gave us almost unbearable attacks of indigestion, were devoured to the last morsel. To-night we came upon soft salt, it was tough walking—placing one foot down it would sink up to your shin in soft mud, and having no foothold it was necessary immediately to place your other foot in front of the first to keep walking. We made no more than 15 miles a day through this.

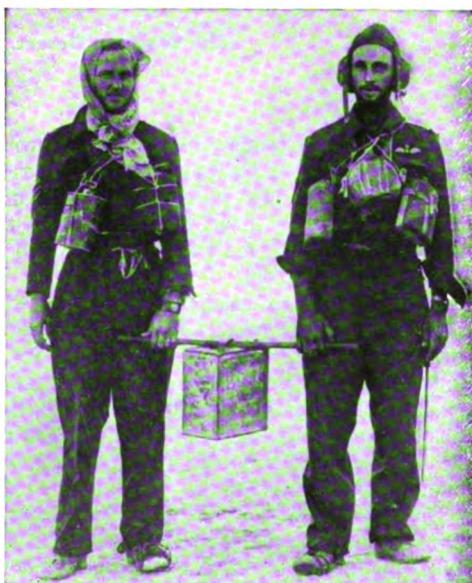
"Twentieth day. Last night our food gave out, despite our rationing. Water was very low, just about two bottles full. We were very weak, shoes just about off our feet. At night

we came upon five Bedouin driving about 70 camels. They gave us a handful of dates and a drink of salty water.

"Twenty-first day. Attempting to walk a few miles during the day, the weather not being very hot, we came across two Bedouin grazing camels. Taking us into their camp they fed us with rice and camels' milk diluted with water. The former tasted like macaroni and cheese, the latter, although very strong, was quite refreshing.

"Twenty-second day. We entered camp amidst very curious Arabs. Fed on dates, rice and oil, and drank salty water. Quite a ritual. Still very weak, but recovered.

"Twenty-fourth day. Arrived at a salt lake at about 0400 hours, mosquitoes unbearable. Hearing and finally sighting what seemed to be a motor lorry from a nearby hill about 0800 hours we headed north and were finally picked up by an advanced armoured division about 5 to 10 miles north of El Maghra."



F/Sgt. B. and Sgt. D. return to their squadron, after 24 days and nights on foot in the desert. The water-bottles are German, Italian and British; the leaky two-gallon can is still with them. Note their shoes, fixed with wire. They had seen the Allied barrage at Alamein from behind the enemy's lines



The Western Desert. Nearly all the fighting swung to and fro along this narrow coastal

The Army unit which picked them up brought these two airmen—a Canadian and an Australian—safely back to their squadron. It tells much of the character of desert flying to record that, by the end of 1942, the Late Arrivals Club had a list of 345 members.

That is one more aspect of the desert which many of the pilots knew. Normally, however—for they hoped to traverse it always in the air and not on foot—they saw it as a sea of emptiness beneath them, across which they had to navigate their way much as their comrades engaged over the Mediterranean steered their aircraft, with few landmarks or signposts.

The geography of the Western Desert is familiar, since campaigns waged back and forth across it for more than two years. Yet the pilot's desert geography was something unusual. When his aircraft kicked out a plume of sand and took off from a square of flattened claypan, his view was divided into two halves, running always from east to west. On his right hand stretched the fabled blue of the Mediterranean,

on his left a still vaster space of tawn-coloured emptiness, shadowed here and there with the darkness of a patch of knee-high camelthorn, with a bluff, a wadi, and intersected everywhere by thousands of criss-crossing tyre tracks. The division of these two halves of his view were the coast, the coast road and the railway to Tobruk. all roughly parallel and all bunched together.

He saw on his right the towns. A village at Burg el Arab with a crenellated fort in the best story-book manner; a small Egyptian watering-place at Mersa Matruh; the hamlet of Sidi Barrani; another on the shores of the little circular bright-blue bay of Sollum, where the road winds up a towering cliff at the water's edge; the white buildings of the natural fortress of Bardia on the cliff-top; Tobruk curving round a small land-locked bay; then nothing more till the towns of the Jebel Akdar and the big white city of Benghazi.

But he was far more concerned with the landing grounds, of which in the desert there were hundreds, often grouped in bunches of



trip. The principal airfields are shown by circles; there were scores of satellite landing grounds.

three and four separated by only a few miles. There were dozens of them for the night bombers right back in the Suez Canal zone, dozens more grouped around the Cairo-Alexandria road. Out in the desert itself the more easterly were mostly placed on the table of the Libyan plateau which rises just south of the coast to a height of some 200 feet. From east to west the main groups of landing grounds were at Daba, Fuka, Sidi Haneish, Sidi Barrani, Sidi Azeiz, Baheira, Gambut, Tobruk, Gazala, Martuba, Derna, Mekili, Msus, Agedabia. That by no means exhausted them. There were scores more dotted all over Egypt and Cyrenaica, scores more still extending into Tripolitania. Where they lacked, they could be made from virgin desert in a few hours by a determined ground-party.

Along the desert coast, pressed close to the sea, there is a string of wadis in which cultivation is possible; it was once one of the great agricultural areas of the world, and even now is fertile with occasional tomatoes, onions, little stunted stems of corn and a multitude of wild flowers; but

inland a couple of miles lies desolation—a wide expanse of country, sometimes flat, sometimes rolling, soft sand in one area, rock in another, naked here but dotted there with brown-grey knee-high scrub on which an occasional herd of camels browses, to the scant interest of the white-robed herdsman.

The border between Egypt and Libya runs north and south just west of the clifftop at Sollum, marked by mile after mile of the barbed wire fence which Mussolini built to discourage tribesmen from emigration on such occasions as the hurling of their chieftains to death from aircraft flying above their villages. Just beyond the border, the great Italian coast road to Tripoli starts with a triumphal arch and a cemetery of German dead. There too starts one of the great desert tracks, the Trigh Capuzzo, rutted and murderous to car springs but broad and well defined. South-west of Tobruk the Trigh intersects another big track, the Trigh Bir Hakeim, and the point of intersection has been christened Knightsbridge.



The Newcomers. Kittyhawk fighters, whose close tactical co-operation with the light bombers, perfected through hard-fighting weeks of experiment, was to change the whole shape of the desert war.

3—Hard-Fighting Weeks: the Pattern Forms

THE R. A. F. BEGAN the war in this desert around Mersa Matruh in the summer of 1940. That winter the squadrons swept with Wavell's Army as far as Agheila, annihilating a large Italian air force, and were then beaten back to their original positions. All the following summer they stayed there, while battles were fought in Greece and Crete, Syria, Iraq, and Persia. In November 1941 began the great desert drive which carried them once more to the gateway of Tripolitania at Agheila.

By early February 1942, the British forces had been driven back to a line running southwards from Gazala. The Kittyhawk fighters which had just come to the Desert Air Force made clear on February 14th the British intention to hold this line, by destroying at least twenty of a formation of some thirty-two dive-bombers and escorting fighters which were attempting to attack our troops at Acroma, and damaging the rest. Not a single Kittyhawk was lost and the only damage they received was a cannon-shell hole through the tail of one aircraft. The fight was carried down so low that some of the pilots could see our troops on the ground throwing their hats into the air. This victory was won by two of the most famous squadrons of the Desert, one of the Royal Australian Air Force, and one the "Shark" squadron of the R.A.F.—so called because they had painted the noses of their aircraft to resemble the jaws of sharks. Several of the pilots of this great squadron were men from the Dominions.

From that moment onwards the Desert Air Force, under the command of Air Vice-Marshal afterwards Air Marshal Sir Arthur Coningham, K.C.B., D.S.O., M.C., D.F.C., A.F.C., could settle down to a static period of some three months on the airfields around Gambut.

There are several rivals to the claim of being the dustiest place in the Western Desert, but in any list Gambut ranks high. About 30 miles east along the coast road from Tobruk there is a battered roadhouse by the side of which a rough track turns off to the south and within a mile zigzags up the side of the escarpment. At the top it reaches a wide plateau of which the only

permanent features are a small stone blockhouse and a rough stone wall, built for heaven knows what purpose, beyond which lies a vast scraped landing ground littered around the edges with tents, trucks, gunpits and big piles of crashed German and Italian aircraft. The tracks that edge this landing ground have been cut up by traffic into a foot or more of fine dust which billows in a great cloud when even a solitary car passes that way; the wake of half a dozen aircraft taking off, as they do at short intervals, is a yellow blinding fog. That is Gambut.

The track meanders on farther to the south, and soon zigzags up a second escarpment on top of which it crosses the desert railway and the wide, bumpy Trigh Capuzzo. Beyond lies another vast landing ground, some more tents, guns, trucks, some more aircraft. That is Gasr el Arid.

On top of both these escarpments other tracks wander off in many directions, arriving now and then at other satellite landing grounds, each with its complement of tents, guns, trucks and aircraft, for a distance of 15 miles or more. Cap the whole thing with a burnished dome of sky, blow across it periodically a hot wind from the south laden with dust storms, mix the available water with equal parts of chlorine and mud, fill the tents with thousands of cheerful young men in khaki shirts and shorts (and with several million flies) and you have the home of the Desert Air Forces, both fighter and bomber, in the spring of 1942.

There was plenty of fighting to do even though this was a static period. The Luftwaffe was raiding in strength against Tobruk and the railheads at Capuzzo and Mischifa, so that almost every day there was a combat.

Almost every day there were air attacks on the enemy on the ground. Almost every day there were losses, as when on April 11th seven Tomahawks flew straight at a formation of 30 enemy aircraft and lost five of their number, but not before destroying three of the enemy. Almost every day there were victories, though few as complete as that of May 12th when a formation

led by four Beaufighters and escorted by eight long-range Kittyhawks intercepted the enemy air-supply route between Crete and Derna. About 50 miles out to sea they sighted 20 Ju.52s escorted by Messerschmitts. The Junkers were evidently full of troops, for a multitude of tommy-guns were pushed through the windows to open fire as the Beaufighters led the first beam attack, the Kittyhawks taking care of the escort. The fight lasted for 19 minutes and ranged over a distance of 40 miles. The Kittyhawks, soon disposing of the Messerschmitts, came down to join in the attack on the troop-carriers. One after another the Junkers aircraft fell in flames into the sea and burnt out on top of the water, all save one which glided gently down and sank beneath the surface. Some of the troops jumped in panic without parachutes to an instant death before their aircraft touched down; some struggled out from the surface and fell into patches of burning oil.

When Derna was in sight the Beaufighter leader could see only two Junkers, straggling for the coast. Behind him a line of aircraft and patches of oil burning on the surface of the sea seemed to stretch almost to the horizon, looking at a quick glance, he said, like a convoy of ships in line astern. Only those aircraft which had actually been seen to strike the sea were claimed as victories, but even so the score was impressive. The Kittyhawks destroyed 10 Ju.52s and two Messerschmitts. The Beaufighters destroyed three Ju.52s and probably two more. Our loss was one Beaufighter in the first beam attack.

Not by day only, but by night there was fighting to do. On every moon enemy bombers attacked the landing grounds in the Gambut area, the port of Tobruk or the railhead at Capuzzo. The A.A. barrages were magnificent, particularly at Tobruk and Gambut where streams of red tracer shells climbed the laborious air to the persistent crash of the heavier guns; sometimes through all this fantastic pattern streaked the small white-tracer jet of the rear guns of one of the German bombers, the gunner not wanting courage as he tried with little success to destroy our fighters on the ground. A squadron of Hurricanes was trained to combat the night raiders over the desert, guided only by the direction of the flak and the keenness of the pilots' eyes under admittedly a very bright moon. This same squadron also became freelances of the night against enemy camps and transport.

They took off singly or in pairs and searched the wadis and roads for the enemy.

Every day without exception there was work for the reconnaissance squadrons, Marylands and Hurricanes, which penetrated the farther or the nearer enemy positions to report by photograph and by eye what moves were made. Equally there was the continual task of reconnaissance over the sea, the task that never ended, some of it carried out from the desert, some from Malta.

This constant offensive fighting and reconnaissance was particularly necessary in the first few weeks during which the squadrons were around Gambut, because of the poor state into which the aircraft had fallen. Aircraft and crews that should have filled the gaps created by three months of advance and retreat were being diverted to the even more clamant needs of the Far East. Many of the aircraft that remained were sadly in need of overhaul, of spare parts, of rest; only the pilots seemed not to tire.

In the early days of March the serviceability, which means the actual fighting strength at that moment of the squadrons, was so low that scarcely one complete fighter wing could be mustered in the desert. Serviceable aircraft had to fly all the harder to hide this weakness from the enemy. Then it rained so heavily that for a short time even the serviceable aircraft could get into the air only with difficulty. A German reconnaissance aircraft came over that morning, skirting the white puffs of the A.A. shells high above the escarpment. Soon there were reports from the forward positions that a force of 50 plus enemy fighters and bombers was heading towards Gambut. A ground controller tried a quick bluff. Into the radio telephone he gave a curt order to scramble three squadrons—to get them into the air, that is, to await radio orders. Two minutes later he ordered another two squadrons to scramble. In reality not a single fighter could get off the ground in time, but the whole enemy formation turned round and went home without even sighting the target. Thus we had proof that the Germans were listening to the radio control of our fighter squadrons.

Behind this screen of constant endeavour the Desert Air Force was not merely waiting for reinforcement in order to renew full-scale assault, but was perfecting new technique. All the faults of the winter fighting were carefully examined and the remedies sought. The system



The Luftwaffe scrambles as Bostons of the S.A.A.F. surprise a Martuba airfield. The light bombers maintained a constant offensive against these forward landing grounds.

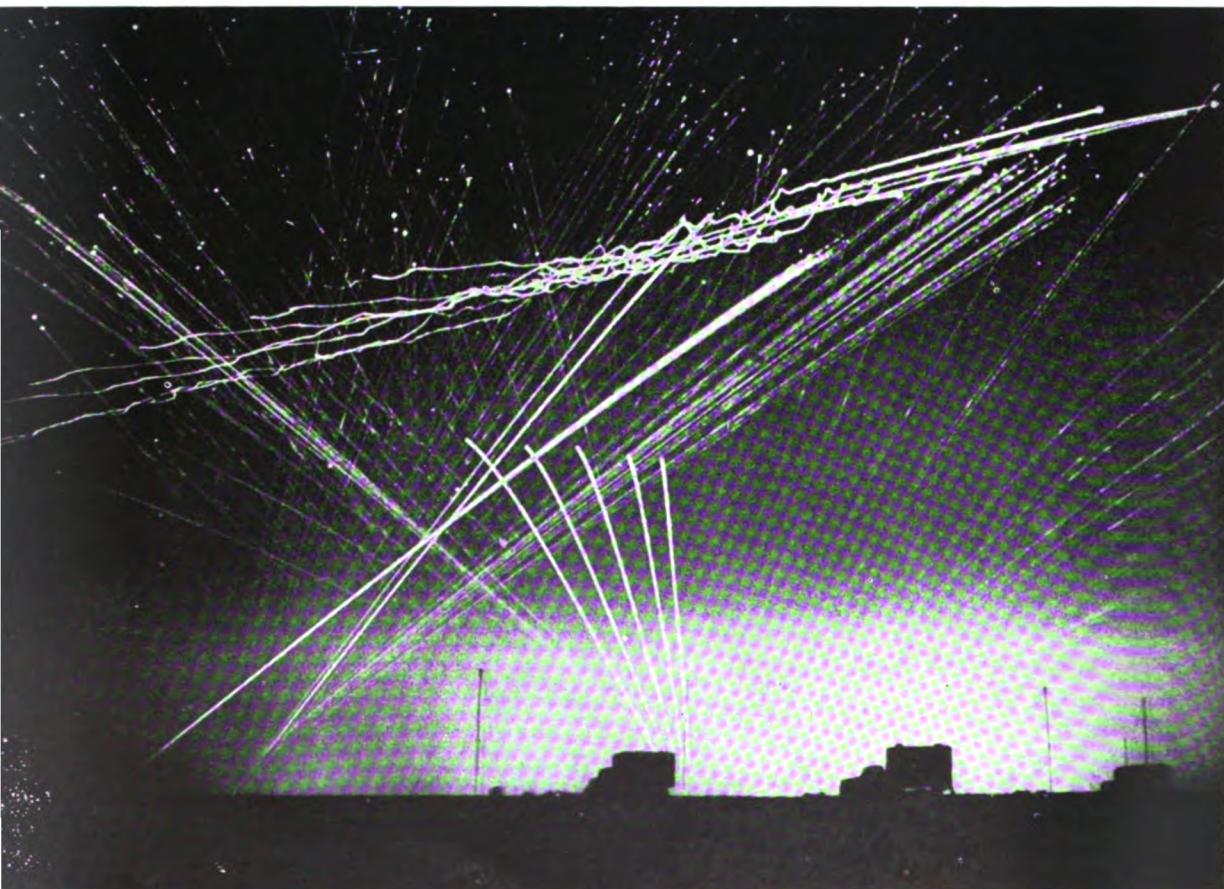
of liaison between Army and Air Force was reorganised and tightened, and the practice of keeping squadrons waiting for call from the Army was discontinued.

A fighter wing was set aside to specialise in the task of protecting the light bombers, fighter pilots and bomber crews holding frequent conference to evolve the best tactics. Those hard-fighting weeks of experiment with the Bostons and the Kittyhawks were later to change the whole shape of the desert war.

The other big development was that of the fighter-bomber. More has been argued on the subject of dive-bombing than on probably any other aspect of the air war. The German

Junkers 87, the Stuka with its demoralising dive, swept through Europe in support of the Wehrmacht. It was one of the first weapons of the Luftwaffe to be shipped to North Africa when British troops stood opposite Agheila for the first time. The troops who were subjected to it frankly detested it. Nevertheless, against targets of reasonable dispersal in the desert the Stuka was a failure. That is not to say that the Stukas did no damage; of course they did. But it was not commensurate with the losses they suffered. For the Stuka in flight is almost defenceless, needing the strongest fighter cover which even so never debarred the desert fighters from the satisfaction of a "Stuka party."

"The A.A. barrages were magnificent." The enemy attacks a fighter landing ground. Flares silhouette lorries, a caravan trailer, radio masts. Red tracer shells climb slowly up and flak peppers the night sky. The photographer is crouched in a sand-hole.





The bright desert moon, the direction of the flak and the pilots' own keen eyes guided the first Hurricane night fighters.

The Air Force of the desert never had a dive-bomber, nor wished for one. Instead it developed a fighter-bomber. During the winter a squadron of Hurricanes was fitted with some small bombs and the first experiments were made with considerable success. During this period at Gambut they were re-equipped with two larger bombs. Then the experiment was applied to the Kittyhawks, each of which was found to be able to carry a single bomb of heavier weight still. Not until the battles of the summer were the squadrons to discover how effective was this new

weapon—this fighter-bomber that could protect itself, could aim as accurately as any dive-bomber, could protect heavier bombers if necessary and could answer an army call for support more quickly than any bomber in the world. Many of the fighter-bomber pilots dropped their first bombs when they were actually called into urgent action.

When war broke out in the Middle East the only night bombers available were elderly Bombays, painfully slow aircraft with fixed undercarriages, which nevertheless managed to reach

Benghazi, beyond their maximum range, by refuelling themselves in flight from 40 four-gallon cans of petrol stowed inside the fuselage and tipped into the tanks through a funnel as a motor car is fuelled. They were soon replaced by the first Wellington bombers to reach Egypt, and by the spring of 1942 there was a respectable force of night bombers gathered on airfields around the Suez Canal zone, with advanced landing grounds for refuelling in the desert.

Sometimes they struck northwards over the Mediterranean at targets in Greece and Crete, but their chief task, then as always, so it seemed, was to batter Benghazi. They did this raid so often in a climate where bad weather rarely interferes with night flying that they nicknamed it the "mail run." Yet it was no easy flight. In distance it was roughly the equivalent of bombing Munich from Norfolk. The route was not splattered with guns and searchlights, true, but on the other hand a crew had to crash-land only 50 miles inland on the desert to be faced with the torments, often mortal, of thirst and heat. And the defences of Benghazi itself were fierce. More than all the dangers, though, the chief menace of the mail run was its inevitability, night after night, like a rheumatic twinge. One of the squadrons wrote a song about it, the *Mail-Run Song* which ran (slightly bowdlerised) to the tune of *Clementine* :—

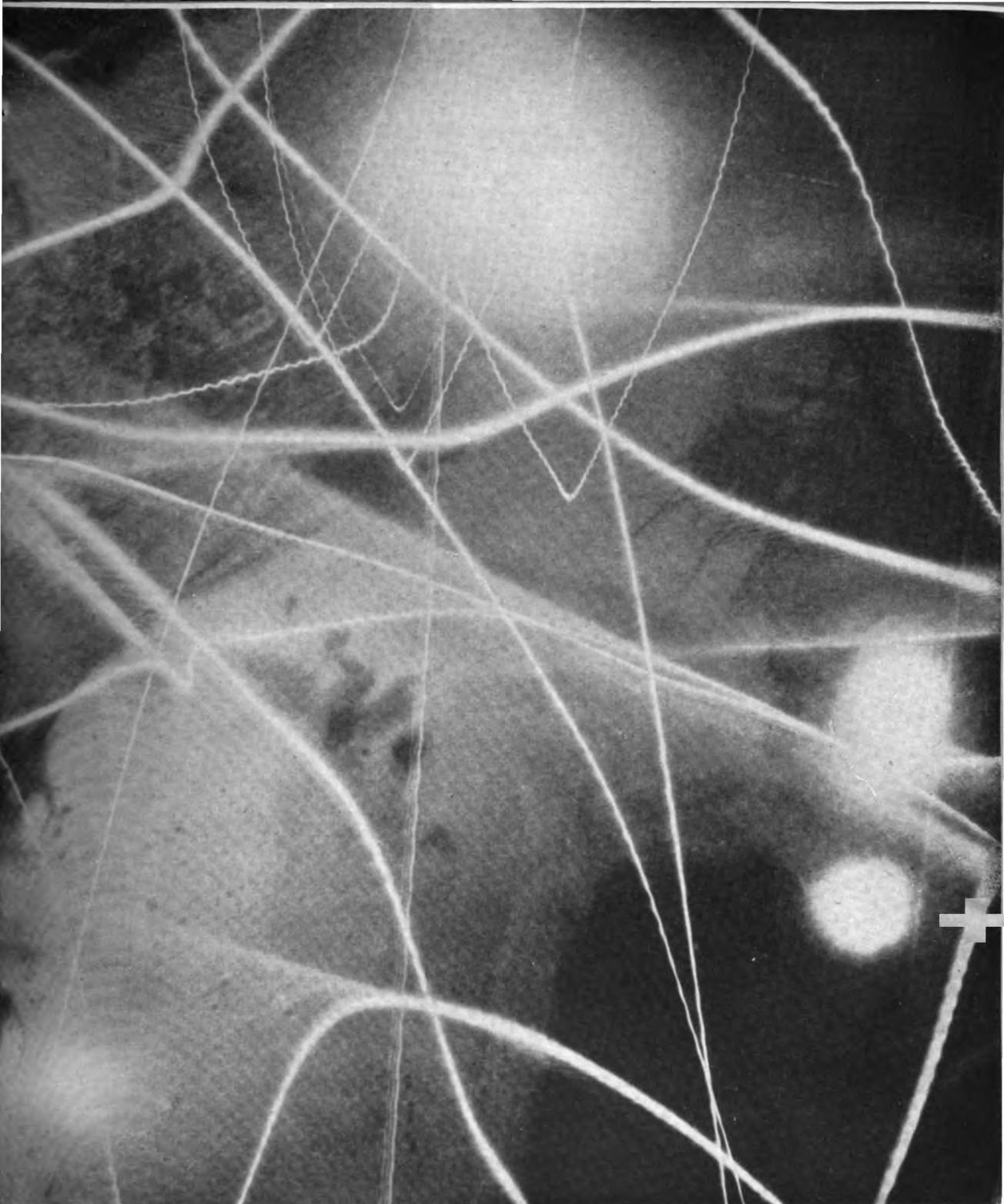
Down the Flights each ruddy morning
Sitting waiting for a clue,
Same old notice on the Flight board,
Maximum effort—guess where to.

Chorus :
Seventy squadron, seventy squadron,
Though we say it with a sigh,
We must do the ruddy mail run
Every night until we die.

"Have you lost us, navigator ?
Come up here and have a look.
Someone's shot our starboard wing off."
"We're all right then, that's Tobruk."
(a garrison naturally quick on the trigger
at that time, particularly at night)
Oh to be in Piccadilly
Selling matches by the score,
Then we should not have to do the
Blessed mail run any more

Chorus :
Seventy squadron, seventy squadron, etc





The mail run brings a heavy post. The bomber crews cannot hear the A.A. barrage; they only see it — the small winking gun-flashes, the larger explosions of the bombs, with sometimes a deepening glow, the multi-coloured tracers and scarlet flaming-onions drifting slowly down. But this brief respite of the Axis was battered night after night for many months.

On the nights when they were not flying, the crews sat around in their messes with glasses of thin local beer and sang the mail-run song with an intensity of feeling that only desert life can lend to the voice. "We must do the ruddy mail run every night until we die." A good many of them did. But the hazards they took and the fatigue they endured had already, by that time, made Benghazi of considerably less value to the enemy as a supply base.

In the spring of 1942 the night-bomber force was made more mobile and moved up into the Western Desert from the base stations in the Canal zone. The advantages of placing the whole ground organisation of the bombers on wheels are apparent. The nearer to their targets the bombers can start, the less petrol they need and the more bombs they can carry. The difficulties of the undertaking were also apparent. After long experience the desert fighter and light-bomber force had been so organised that it could move forwards or backwards at a speed of 100 miles a day if necessary without the aircraft being grounded for a single minute. Now the same thing was achieved with the medium and heavy bombers in spite of far more complications.

Think of a man and his wife who decided to travel from London to Southend on August Bank Holiday in peace time and the transport difficulties they met; then think of a man and his wife with a family of 10 children attempting the same thing. That is a rough comparison of the relative difficulties of moving fighters and bombers about over the desert.

The crux of the whole bomber problem was to carry backwards and forwards over the roughest surface a great weight of bombs and petrol. For one medium bomber to make a raid on, say, Benghazi, there had to be something more than 4,000 lb. of bombs and 2½ tons of petrol available at its airfield. Each heavy bomber needed up to 9,000 lb. of bombs and about five tons of petrol. All that had to be carted on trucks, as well as the motor fuel, the tents, rations, water, men, kit—the thousand things essential in a bare desert.

It was done. The night-bomber force was placed on wheels without interfering with the nightly strength of bombing. The mail run to Benghazi was made on 23 nights in March, 24 in April, 21 nights in May, and throughout the period there were attacks on the northern targets in Greece and Crete and later on those of the

enemy airfields in the desert itself. But Benghazi, through which port the enemy was rapidly accumulating new strength, remained the chief target.

Night after night the Wellingtons throbbed through the searchlights and A.A. fire, the bombaimers crouched on their stomachs against the perspex of the nose, the pilots turning this way and that in evasive action, the gunners searching the bright moonlight of the sky for night fighters. From above, the harbour itself looks almost too small and insignificant for all that trouble. The moles and the inner harbour form a rough box-shape with the Cathedral mole sticking down in the centre. It is quite easy under an African moon to discern detail, even the little projections nicknamed George, Harry and Johnny, which once were ships with such names as Maria Eugenia and Gloriastella, and now, as wrecks filled with concrete, had become the main unloading piers. From above it is not possible to hear the A.A. barrage but only to see it—the flashes of the heavy guns like light winking from the facets of a turning jewel, the multi-coloured streams of tracer hose-piping upwards apparently without plan, the scarlet flaming-onions drifting upwards in little linked groups as slowly as a child's balloon. It all seems, without the noise, too remote and pretty for actuality.

The bombing itself seems just as unreal. The slight bump in the aircraft as the bombs leave is almost unnoticed. It is difficult to pick out the flash of their explosion among the thousands of flashes below. Then suddenly there is a small red glow on the base of one of the moles, a deepening glow, a shadow of black smoke, perhaps a vivid green flash. It means that some dump of warlike material, manufactured in Germany under the threat of bombs, carted with great labour across Europe's congested railway system, loaded under more bombing into a ship at Naples and borne across the sea through the threat of bomb and torpedo, has been unloaded at Benghazi in vain. All that effort has ended in a deep-red glow and a streak of smoke. There is the reality.

Night after night it happened, until at mid-summer the experts who study photographs could say of Benghazi that there was scarcely a building which had not suffered to some extent, that beside the wrecks in the harbour the outer mole had been broken in three places, that some half of the warehouses had been so damaged

that great piles of stores stood in the open, that the powerhouse was silent, the railway sidings littered with bent and twisted rails. But ships were still coming into the harbour, many of the supplies were still filtering through to the enemy armies of the desert, and the three wrecks—George, Harry and Johnny—were still there, still acting as unloading wharves. Their fate was reserved for later.

The attempts of the Luftwaffe to bomb our back areas in Egypt were intermittent, never very considerable and apparently based on no long-range plan. During the summer of 1941 there had been a number of night raids on supply and repair centres in Egypt which had had only one success of any importance, the destruction of an R.A.F. maintenance unit, although the poorer districts of Alexandria had been damaged from time to time and some civilians killed and injured.

There had been little raiding during the winter, but in the spring of 1942 it started again. Meanwhile an R.A.F. night-fighter squadron had been moved into the Nile Delta, the chief ambition of its crews being that the Germans should give them a chance to show the technique they had developed in the night skies of Britain. The squadron was commanded by Wing Commander G. H. Stainforth, A.F.C., famous in peace time for his Schneider Cup Victory. Wing Commander Stainforth, who was the oldest pilot flying on operations in the Middle East, was later killed in action in a night fighter.

On the night of March 2nd/3rd, about 35 German bombers attacked many parts of Egypt from Alexandria and Port Said down to the Suez area, doing some damage to one of our airfields which was heavily bombed and machine-gunned. It was a night of bright moonlight. A force of night fighters intercepted some of the raiders and shot down two Heinkels. This loss was insufficient to deter the enemy, and from time to time more bombing raids came over by night, directed principally at Alexandria. On the night of April 7/8th they were intercepted by night fighters and one pilot, Flight Lieutenant R. C. Fumerton, D.F.C., R.C.A.F., shot down two of them.

The big night was that of April 28/29th, when about 25 Ju.88s and He.111s attacked Alexandria. Three of our night fighters made interceptions. One of them again shot down two raiders in a single night, another probably destroyed a third, and another damaged a fourth. The A.A. gunners scored one destroyed. Twenty per cent. of the raiding force had been knocked out, and this ascendancy over the night raider was maintained from that time onwards, although there were still occasional raids, mostly on Alexandria.

Between March 2nd and the decisive battle which was to open in the Western Desert in November 1942, the night fighters shot down a total of 41 bombers over Egypt alone, and a number more over Malta. This was additional to the success of the Hurricanes which flew by night over the Western Desert.

4—To Keep the Squadrons Flying

BEHIND AN air force in battle there must be a large technical force on the ground. The bravest and finest pilot in the world is useless if his aircraft through some mechanical defect cannot leave the ground; or if, having been shot down in battle, there is none other into which he can step. The first problem in the Middle East, indeed, had been to provide the very elements of the force—aircraft, airmen, signals equipment, guns, split pins, nuts and bolts, all the three-

quarters of a million separate items which must exist in order to keep an air force flying in the air. Even in a highly industrialised country like Britain, with aircraft and engineering industries of long experience and great skill, the problem took a wearisome time to solve. Imagine then the magnitude of it in Egypt, where no such industries existed, where machinery was often obsolete and always inadequate, where power is expensive to produce, and to which the shipping

supply lines from Britain had then to travel all the 14,000 miles of the sea route round the Cape of Good Hope.

Nevertheless, by the spring of 1942, R.A.F., Middle East, possessed a vast and efficient maintenance and supply organisation, stretching from advance units in the Western Desert to factories in Persia, from the Mediterranean shores across the central jungles to West Africa. Something must be said of this organisation without which there would have been no air war in the Middle East at all.

There were two answers to the problem of how to build a big air force, expressed exactly in the very term "maintenance and supply." New material was supplied direct from the two major arsenals of Britain and America, the difficulties being in the main how to get it to Egypt. At the same time all the material that was actually in the Middle East was conserved and, after it had been in battle, repaired; here the task was to set up an organisation for salvaging it from the battlefield and for making good its damage at the most urgent speed.

The obvious way to supply fighter aircraft to the Middle East when we could still use airfields in Europe was to fly them from Britain across France, and then via Tunis and Malta to Mersa Matruh. The longest hops could just be managed on petrol endurance. The bombers could make the journey with fewer stops. In fact, before France collapsed, three Blenheims and six Hurricanes reached Egypt in this way. Then the route was closed. Long-range night bombers could still fly direct from Britain, refuelling at Malta, but not the fighters nor the short-range bombers.

Fortunately there existed the British Overseas Airways Corporation route first established by Imperial Airways in 1936, from West Africa across the jungle bush and desert to the Sudan and thence to Egypt. The R.A.F. quickly adopted it as a reinforcement route. A small town with a good harbour on the equatorial coast of West Africa was chosen as one terminus and the airfield there was enlarged with workshops for assembling reinforcement aircraft which arrived from Britain by sea. Then additional sites across Africa to Egypt were picked and landing grounds cleared from the bush at the necessary intervals, thousands of natives being employed at the task. Small ground parties of the R.A.F. were set down at

these landing grounds; fuel and supplies were moved in. The first shipload of Hurricanes arrived in West Africa. They were assembled at the workshops, tested, and flown off to the East in a small aerial convoy led by a Blenheim which did all the navigation. They arrived in Egypt in time for the first desert campaign and proceeded to help knock an Italian air force out of the sky.

The pace of the route quickened. More airfields were built in West Africa, more workshops to assemble the aircraft. The men who staffed these great stations were many thousands of miles from the battles in which they fought as surely as if they actually squeezed a trigger; they had also some private enemies of their own, chiefly malaria in a climate of equatorial heat and damp. The pilots who flew the aircraft onwards across Africa, many of them experienced Polish pilots from Britain, had all those evils to fight as well as the hazards of the air route.

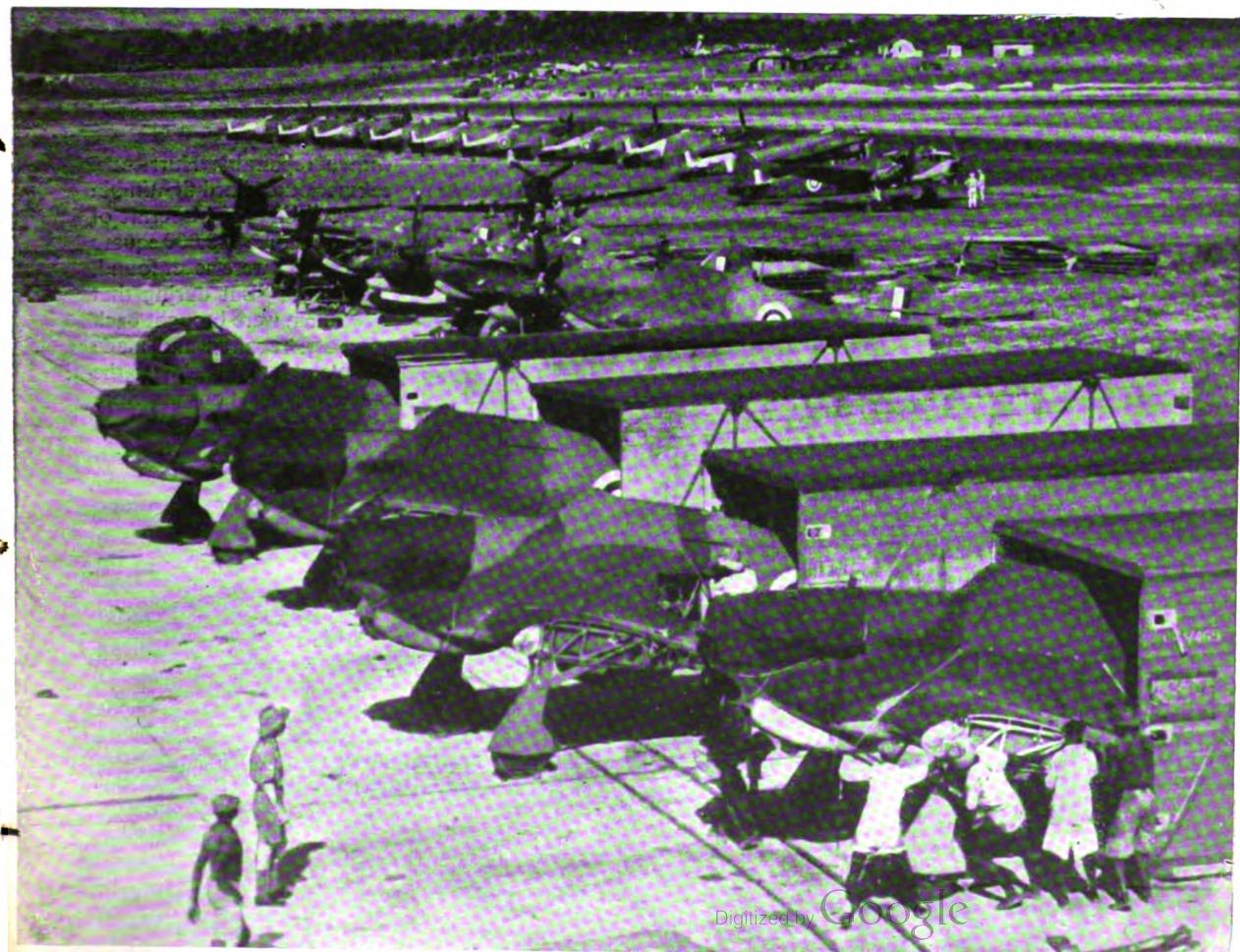
A large and dispersed reception organisation was created for the new supply aircraft which were soon arriving in the Middle East by three main routes—the West African air route, the direct air route from Britain via Malta, and the shipping route to the East African coast, which still brought some aircraft in their crates.

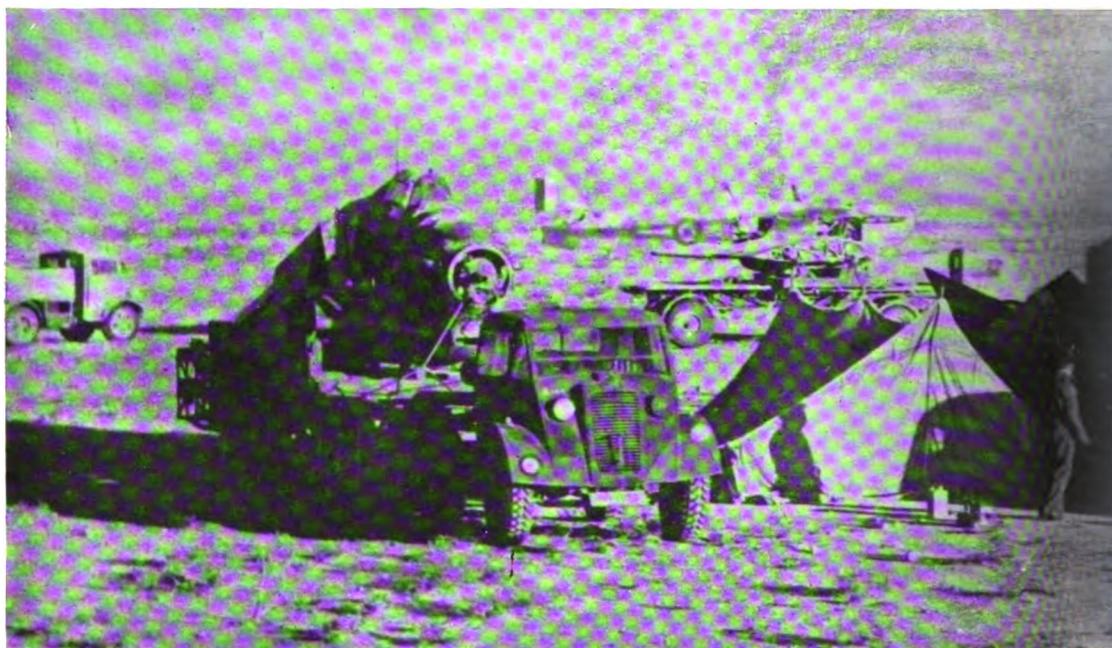
Thus the aircraft came; but aircraft in themselves were only a small part of the supply problem. A war in the air, a technicians' war, consumes an almost infinite variety of objects at a very great speed. Spare parts of aircraft, for instance, may arrive in their millions and still the consumption exhausts them. No matter how fast the supply of material flowed, the long sea and air journeys always involved tedious delay. Supply alone could never keep the squadrons in the air; there had also to be maintenance.

The theory of maintenance of an aircraft in battle is simple. When it is shot down or damaged or when the stress of flight has worn out part of its mechanism, it must be brought back to base and repaired. Only a small organisation existed in peace-time Egypt for this necessity. There were a few ill-equipped ground units, whose task was to retrieve lame aircraft: they were known as repair and salvage units, or briefly R.S.U.s. Each aircraft has its own ground crew of mechanics, each squadron its engineering staff, and they themselves with the



Airfields built in the jungle and desert of West Africa were the main reinforcement route. (1) The first tree falls. (2) The tropical sun brings its problems. (3) Crated Hurricanes, brought from Britain by sea, are unpacked by local workers and assembled for the flight across Africa. Two Blenheims stand by to lead the convoys.





scantiest equipment perform daily feats of solid, selfless, hard work, and often small miracles of repair, on the airfields. But there are obviously limits to what they can do, and anything like a major repair must be taken back to a well-equipped depot behind the battle zone. Getting it back is the task of the R.S.U.s. They work in parties of a few men, usually under the command of an N.C.O., each party being equipped with a mobile crane for lifting aircraft and some big articulated trucks upon which to place them.

When an aircraft is shot down or has crash-landed, these small parties set off to find it, guided perhaps by a rough indication of the position from the pilot who has escaped or by a sighting report from another aircraft. They bump their way for days over the desert by compass bearing and map. They carry their own hard rations and water, camp at night by their vehicles, push on again the following day. Convoys of big trucks and cranes have picked up wrecks from under the enemy's nose on many occasions, once, with the help of infantrymen, threading their way through a front-line minefield and laying a trail of white tape to guide

them back again with a repairable Hurricane.

During one 17-week period of hard fighting in the desert more than 1,000 damaged aircraft of all types were scattered over some 100,000 square miles of desert. A few of them were never found, perhaps never will be found. But during that period more than 800 of them were brought back to the various base depots, repaired and made operationally serviceable and flown back into the war. The maintenance organisation therefore in that one period created from wrecks and added to our air strength a force considerably stronger, even numerically, than the whole of the air force available in the Middle East when Italy came into the war.

That could not be done only by the salvage stalwarts in the field. There had also to be a large base organisation for the actual work of repair. This too was inadequate when war began. There were two big bases in Egypt, one of which had been destroyed by bombing.

Already, however, a big scheme was being developed to create many more maintenance units, as these repair depots are called, and to disperse them widely with the greatest possible



A repair and salvage convoy breaks camp at dawn. Equipped with mobile cranes and articulated trucks, these units ranged the desert to bring back damaged aircraft. During one 17-week period of hard fighting 800 were brought in, repaired and flown back into the battle.

protection against air attack. Everybody knows the story of the tens of thousands of Egyptians who toiled in ancient days to hew blocks of stone from the Mokattam hills on one side of the Nile, to transport them across several miles and build them into the pyramids on the other side. In fact those Egyptians left not one set of monuments but two—the pyramids themselves, and in the Mokattam hills a great range of artificial caves from which the stone had been taken. Into some of these caves—bombproof warehouses and workshops ready to hand—the R.A.F. moved one of the many maintenance units which were created in 1941.

Only two of the caves were open at that time, for during the centuries there had been falls of rock and rubble which had turned precipitous cliffs into gentle slopes. So once again, after a lapse of thousands of years, a crowd of Egyptian labourers began work on the Mokattam hills, a happier crowd this time of men working for wages, not an army of slaves. Actual methods of work had changed very little. The white-robed men tackled the hillsides with small picks and shovels. They piled the rubble into

old wicker baskets on the end of ropes and tipped it farther down the hill. Children drove panniered donkeys to lift away the heavier pieces. Stonecutters came with tiny picks and wedges and split with the precision of an immemorial craftsmanship great boulders that stood in the way. It looked like a task that would take years; actually in a few months the whole hillside had been gnawed out, the debris had been built into a wide, white approach road up the valley, and the caves stood revealed and cleared. Only two relics were found of the toil of past centuries—in one cave a human skull and in another a large block of squared stone propped at one end on a roller as though in some remote dynasty the workmen had left their work half finished at dusk and for an unexplained reason had never returned.

The caves were whitewashed, equipped with electric light and power, and their floors concreted. At first they were used only as warehouses for every kind of material from photographic paper to bombs, but later some of them were turned into engineering shops. To walk round them now is to walk round a large factory.

Stacked in the sunshine outside are hundreds of oily, sandy aircraft engines straight from the desert. Inside the caves are rows of work benches, bay after bay, where the engines are stripped, checked, repaired and reassembled. In the largest cave of all, domed like a rough cathedral, the finished engines, crated, inspected and ready once more to fly, await in massive numbers the demands of the battle.

Dispersal was another method by which the new maintenance units were built away from destruction by bombs. Some R.A.F. technical officers wandered through one of the poorer districts of Cairo, found an empty timber yard and converted it into an aircraft-engine repair shop, the first of many engineering shops which are now scattered throughout the city. These parts of Cairo are far different from the quarters which Europeans usually see. Tall white modern buildings, great blocks of flats, elegant shops, big mansions and villas line those streets which in season the flamboyant trees clothe in flames of scarlet and the jacarandas in deepest blue. But here the bumpy streets are crowded warrens, higgledy-piggledy with thousands of tiny dark shops open to the pavement where craftsmen tap and men sit to drink interminable coffee and to barter. Women in black robes crowd to the communal well from which a patriarch doles them out water to balance in cans on their shoulders and carry back through twisting alleys to their tiny homes. Children run shouting everywhere, the merchants jostle each other on small flat carts drawn by donkeys, a countryman rides through on a camel, its panniers laden with vegetables. Over the housetops peer the tall bent masts of the feluccas, heavily laden and beating slowly against the flow of the Nile. These are the districts where the real people of Cairo live, where life is vivid and extremely cheerful, always clamant and seldom quite imperceptible to the nose.

The R.A.F. has now moved a whole little industry into these quarters. A door from one crowded street opens on to the hum of lathes of an aircraft-engine repair shop. Gun turrets detached from their aircraft and looking like monstrous diving-helmets are carted through these streets into a large shop where they are refurbished, their guns repaired and tested. The motor trucks which carry the squadrons and their tents across the desert, the sand-plastered motor-bicycles of the dispatch-riders, the signals vans, the cookhouse trailers come wearily back

from the battle to be repaired, garnished, re-camouflaged in a yard in these quarters. That is another side of the creation of the maintenance organisation upon which the whole air war in the Middle East depends.

Take yet another. In the summer of 1941 a hangar on an existing airfield was handed over to five engineers of British Overseas Airways Corporation, and they started to scour the back streets of Cairo to buy hammers, pliers, hacksaws and such elementary tools, with which to found a unit for the repair of damaged airframes (the body of the aircraft as distinct from its engines). Within a year the unit had grown to many hangars, all crowded with aircraft needing repair, ranging in size from the smallest communication machine to the largest Liberator bomber. And more than 1,000 aircraft had been rebuilt and sent back into the fight.

The main task, of course, was to keep the squadrons of the Middle East flying, and it is worth examining some of the seats of craftsmanship, the exploits of the work bench, by which it has been accomplished. One of the most important was the setting up in various places throughout the organisation of chromium-plating shops. Many metal engine parts came in after long use so worn that in Britain they would be put to scrap and new ones substituted; but new parts in Egypt mean valuable shipping space and long months of delivery time. So the old parts are built up again in the plating shops and then ground down to the correct size. The process is tedious, but each time it gives one more aircraft back to the air, and the plating shops alone have vastly increased our air strength.

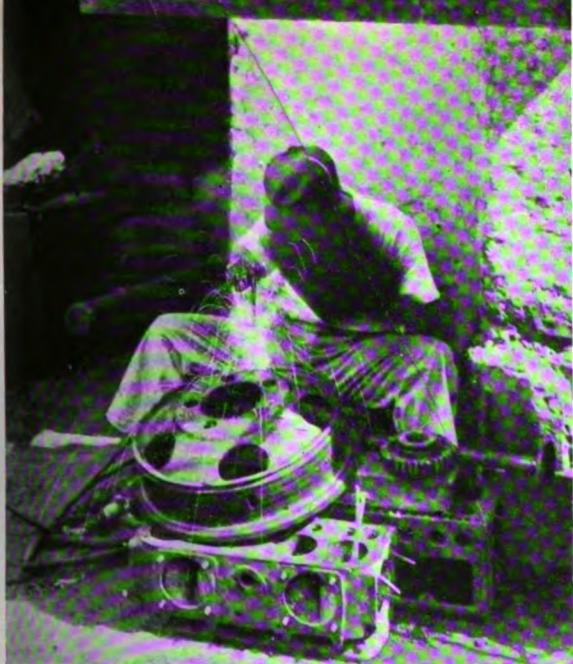
So have the shops where bent airscrews, tangled into unbelievable shapes, are heated and straightened until they are perfect again. The moment at which the airscrew was bent was probably vital and dramatic. A fighter pilot coming out of combat, his aircraft riddled with cannon fire, sought some smooth, flat place where he could crash wheels up; his airscrew made first contact with the sand and the rock, buckling and twisting as he skidded along the ground and then jumped from the cockpit to run for cover behind a pile of stones as enemy fighters dived to strafe him. That was the moment of damage. The long hours of repair are not in the least dramatic, but they require patience and infinite precision.



Huge bombproof stores and repair shops were made from the caves in the Mokattam hills, south of Cairo. The Pyramids, seen faintly in the distance across the Nile, were built of rock hewn from these caves.



Dispersed in the back streets of Cairo is a whole little industry, the maintenance units which renew and reassemble the aircraft brought back from the desert. This one was an empty timber yard; it became the first engine repair shop. Outside its doors hums the vivid, clamorous life of native Cairo.



In the hundred or more little shops, using such tools as could be found in Cairo, craftsmen worked with remarkable precision. *Above*, an electric welder repairs a brake-drum: he is sitting out in the street. *Below*, the massive airscrew for a Tomahawk moves into position.



The twisted blades of the airscrew are stripped, cleaned, and then annealed in a bath of salt liquid with heat, until they are soft enough to be bent. Thence they pass through a series of presses. A second immersion in molten salt followed by a swift plunge into cold water hardens them, and they have but to be polished, sprayed and balanced into a perfect airscrew once more. The hot-bending of airscrews in this manner was once considered an operation of great technical difficulty, possible only with the aid of most expensive presses, twisting machinery and test tables. Having no such things at a nearer distance than 14,000 sea miles, R.A.F. technicians installed presses costing £25 each and worked by a lad, on the handle, together with a heavier press which in happier days crushed grapes in Turkey for the production of wine; they made twisting machines from pieces of scrap metal and worked them with salvaged motor-car jacks; they made their special test benches from girders torn from a roof by bombing; they produced airscrews straightened as perfectly as they could have been anywhere in the world—airscrews which lifted hundreds of fighters and bombers off the ground into battle again.

Thus, in the spring of 1942, the air power of the Middle East stood as well prepared for decisive battle as the men of the Command could make it, within the limits of the weapons and the material they possessed. To sketch its pattern briefly once again, it was split into four linked components. In the Western Desert was the mobile force of fighters, fighter-bombers and light bombers, to take part in the immediate battle. Based on Egypt was the striking-force of night bombers. A force of defensive day-and-night fighters was posted throughout the territories we held from Malta to Egypt, Syria to Iraq. Working in co-operation with the Royal Navy from the shores of Egypt and from Malta was a force of coastal aircraft to fight over the sea.

To support this power in the air, the men on the ground were established wherever the squadrons were based; and centred on Egypt was the industrious, ingenious maintenance-and-repair organisation. The commanders could have wished for a stronger air force—more aircraft, more men, ampler facilities—but what they had were trained and organised, and of a great spirit for the battles to come.

II. THE FIGHTING RETREAT

5—Twenty-three Days of Battle

THE trial came in the early summer of 1942. During May it became clear that the enemy intended to make a full-scale assault on the Gazala line in the desert. He did not hide that intention. Every night large numbers of German bombers raided the airfields round Gambut, the railheads which had pushed over the frontier wire well into Cyrenaica and the chief supply port of Tobruk. It was no surprise attack. Rommel considered himself sufficiently well reinforced to sweep the Allied forces aside and to occupy Egypt and the Suez Canal. In the event he was very nearly but not quite right. He had not sufficiently studied those symptoms of air power which were spread before him during our retreat to Gazala.

Had the enemy not attacked in May, we ourselves intended to do so shortly afterwards; but we needed a little more time to accumulate supplies. Our air strength, for instance, was numerically weaker than his. By withdrawing some of the fighters and bombers from the vain assault on Malta, he was able to marshal nearly 1,000 aircraft in Libya, Crete and the Dodecanese Islands. The air forces of the Middle East had only a few more than 700. In the desert particularly our fighters were outnumbered, for against 277 the Axis could match more than 400.

On the other hand, his servicing and repair organisation was nothing like as good as ours. His serviceability, or actual fighting strength at any one time, was rarely more than half the total number of his aircraft. The serviceability of the R.A.F. squadrons was above 60 per cent. when the battle started, and by the crisis weeks at the end of June, when the retreat was at full stretch, it was actually increased to 84 per cent. This was accomplished by an effort on the part of the ground crews and the maintenance workers

that at the time seemed miraculous and even in retrospect looks almost impossible.

The air forces which fought this battle were arranged in four groups, each collaborating with the other, the work of each being dovetailed into a unified air effort.

The desert striking-force was made up of 12 fighter squadrons, three light-bomber squadrons and two army co-operation squadrons, together with a few minor units. Five of the fighter squadrons however had been turned into fighter-bombers, while others were specialising in the work of bomber escort, so that the strength of pure fighters was not great. Most of them were Hurricanes, the rest Kittyhawks and Tomahawks. Had not the needs of Malta been so urgent, there would have been several squadrons of Spitfires in the desert. As it was, the first five Spitfires arrived at Gambut just before the battle started and were promptly "shot down" by the Italian radio in scores. There was some slight reinforcement of fighter strength while the battle was being fought, but it did not compensate for the losses. The light-bomber squadrons were equipped with Bostons and Baltimores, the former flown by the South African Air Force, the latter by the R.A.F.

Farther back in the desert was the force of medium bombers now organised with the ground mobility that has already been described. It consisted of seven squadrons of Wellingtons, one of which had been set aside for the work of launching torpedoes. During the course of the battle a squadron of R.A.F. Liberators was added to this force, together with the first unit of the United States Army Air Force to operate in the Middle East—a formation of Liberators known as the Halverson Detachment.

The group of squadrons which had charge of the air over the Mediterranean Sea stretched from

In the summer of 1942, the new air weapon is tested and proved. During the retreat to Alamein, R.A.F. Middle East holds off the Luftwaffe, shields the army and battles grimly to protect our sea-borne convoys.

the landing grounds of the desert back to those around Alexandria; it was supplemented by the limited use of Malta as a striking-base now that the assault on that island had considerably eased. On the southern shore were eight squadrons for sea reconnaissance and the anti-submarine war, varying in equipment from Sunderland flying-boats to Blenheims and Marylands. There was a striking force of four torpedo-bomber squadrons, Beauforts and naval Albacores, and of two squadrons of twin-engine Beaufighters. In Malta, apart from its fighter defence force, it had been found possible to base three squadrons of Beauforts, three detachments of Wellingtons, a squadron each of naval Swordfish and Albacores, and a few Baltimores and Beaufighters.

Egypt itself was defended by nine squadrons of day fighters, some of which were engaged on the protection of coastal shipping, and two of night fighters. There were in addition some photographic units, an air-sea rescue service, an air ambulance service and three squadrons in all of communications aircraft.

The main battle plan was to allow the enemy to attack, to hold him in the desert, then to counter-attack at full strength—a plan which it was not found possible to fulfil. The task given to the air force was in brief to keep command of the skies, to watch and report every movement of the enemy and to attack him both at his bases and in the battlefield itself. In every particular the air forces succeeded in that task. Although they were eventually forced to retreat on the ground, they won a victory in the sky every day and night.

The battle fell into three very distinct phases. From May 26th until June 17th it was fought from the static positions that had been prepared in the Cyrenaican desert. From June 18th until June 30th the Allied forces were pushed into

retreat as far as the last defence line of the Delta, at El Alamein, only some 70 miles from Alexandria. From July 1st to July 6th that line was assailed, tested and held. Those were the three periods—23 days, 13 days, 6 days.

The enemy started on May 26th to show some activity along the line of minefields and strong-points from Gazala to Bir Hakeim, the most southerly point of the desert line, which was garrisoned by the Free French Brigade; then that night the 15th and 21st Panzer Divisions raced round the south of Bir Hakeim to strike north towards El Adem. They were met on the ground by our own armour and from the air by bombers, fighter-bombers and low-strafing fighters.

At dawn on May 27th, on the airfields around Gambut, the air was vibrating with the harsh beat of Kittyhawk engines warming up. Presently there was a deeper drone as the first formation of Bostons flew steadily over from their landing ground at Baheira farther east, turning in a wide circle. It is difficult adequately to describe the feeling of power in that sight, a feeling that never failed no matter how often one saw it. There was something so unhurried and so purposeful in the close formation of Bostons, something almost leisurely. The dawn sun winked on the perspex of their noses, glanced along their cocked-up tails as they circled. Their engines gave out a calm, deep, inevitable note—and inevitable indeed the Germans were soon to regard them. They came, they came again, they kept on coming, tireless as the running of the days. They flew at first in formations of 12, which were later increased to 18, when our front-line troops glancing cheerfully upwards found a nickname for them. They called them the "Eighteen Imperturbables".

In contrast the Kittyhawks seemed excited and impetuous, though indeed they were not. Flight after flight of them rose from the Gambut landing grounds, kicking aside the long clouds of dust, racing up to the Bostons in swift fours, one man weaving back and forth. In a few minutes they were clustering round the Bostons in the pattern they had so carefully chosen, swarming this way and that, protectively searching the skies; and suddenly the whole dark mass of aircraft headed in a straight line for the west.

They sought out the German columns day after day, navigating across the desert without landmarks. Over the targets the Bostons carefully fanned out to an arranged distance. Then they all dropped their bombs when the leader released his. An avenue of smoke and sand advanced across the desert beneath, looking like a wide glade of woolly white trees in a Disney forest. Somewhere beneath it crouched the tanks and trucks and men of the enemy. Meanwhile, some of the Kittyhawks would certainly have climbed or dived to meet enemy fighters and to edge them away from their charges, while those in close escort clung tightly to the bombers as they formed up again.

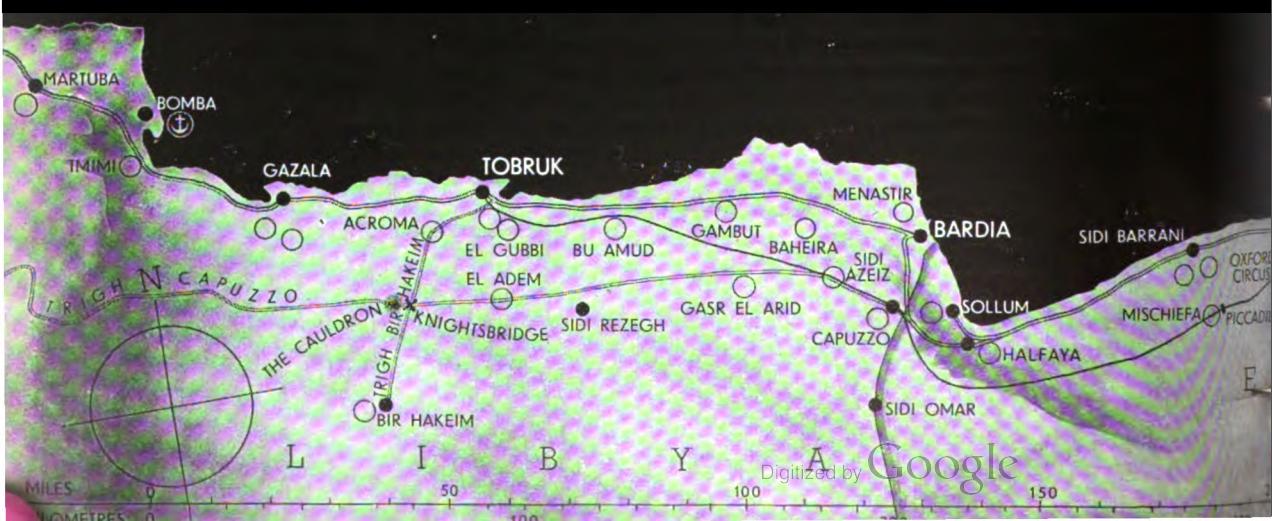
It must be said at once that, although the Kittyhawks escorted the bombers in that way many times a day for many weeks and months, and although they lost many of their own number in the dogfights that raged all round the formations, only on one occasion did an enemy

fighter succeed in penetrating the Kittyhawk screen and shooting down a Boston. That was later on. In these 23 days some of the bombers were lost to A.A. guns, but not one to enemy fighters. Not one.

This happy result was achieved by the long spring weeks of consultation, training and trial during which the Kittyhawks and the Bostons laboured together. The command of the whole formation was entrusted to the leader of the Kittyhawks. Throughout all this period of battle the Kittyhawk wing, which was set aside for this vital task of protecting the bombers, was commanded and frequently led by Wing Commander T. B. de la P. Beresford, D.S.O., D.F.C. The majority of the fighters which he led were squadrons of the S.A.A.F.—a particularly happy choice, since the Bostons which they protected were also those of the South Africans.

This was not the only air attack to which the advancing panzers and the supply columns immediately behind them were subjected. For the first time the enemy discovered that we had a Kittyhawk fighter-bomber. This new weapon had been saved until the first day of the actual battle, and indeed some of the pilots who flew at the transport columns had never dropped a bomb before in their lives. Sometimes the Kittybombers went out in separate formations, sometimes they formed part of the escort to the Bostons, adding their own bombs to the general weight and then re-forming to revert to their

On the night of May 26th, the 15th and 21st Panzer Divisions raced round the south of Bir Hakeim. They were



THE FIGHTING RETREAT

task of fighters. This greatly increased the strength of the air attack. Whereas the Stukas could not venture without a large umbrella of fighters to protect them, the Kittybombers themselves formed part of the air umbrella to the Bostons.

The assault that was flung at the German columns in the first days of their advance was increased also, at considerable cost to the squadrons, by low-flying fighters strafing with their guns. The pilots who did this knew well the risks they were taking. They had to ignore the probability of being jumped from above by Messerschmitts—we had insufficient fighters to give them top cover—and they had to face the intense ground fire of the guns of the column itself. During the three days from May 29th to 31st, 39 fighters were lost. Strafing had then to be abandoned; such a cost could not be endured.

In the first few days aircraft alone destroyed about 1,050 enemy vehicles, killing the appropriate number of men. A German signals officer wrote in his diary on only the second day of the battle: "Low-level machine-gunning . . . chaos, panic." Prisoners who were hauled into our lines burst out with oaths against the Luftwaffe. "British aircraft seem to be able to do what they like without interruption," said one. "We are cursing the lack of air support," said another.

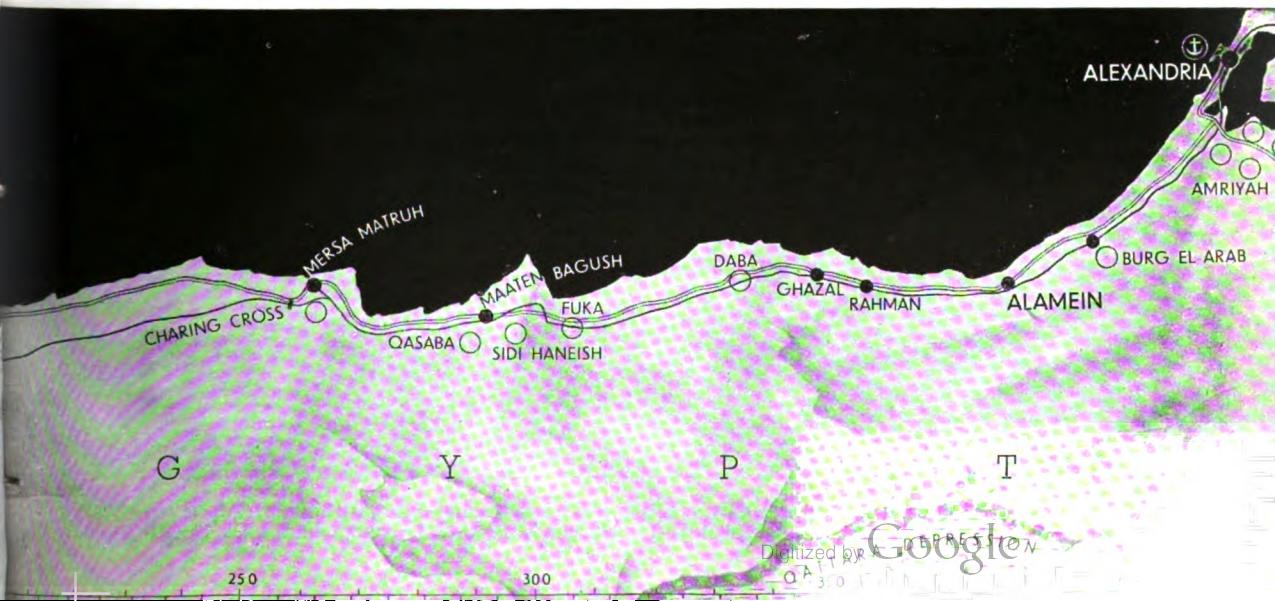
They were doing less than justice to their own

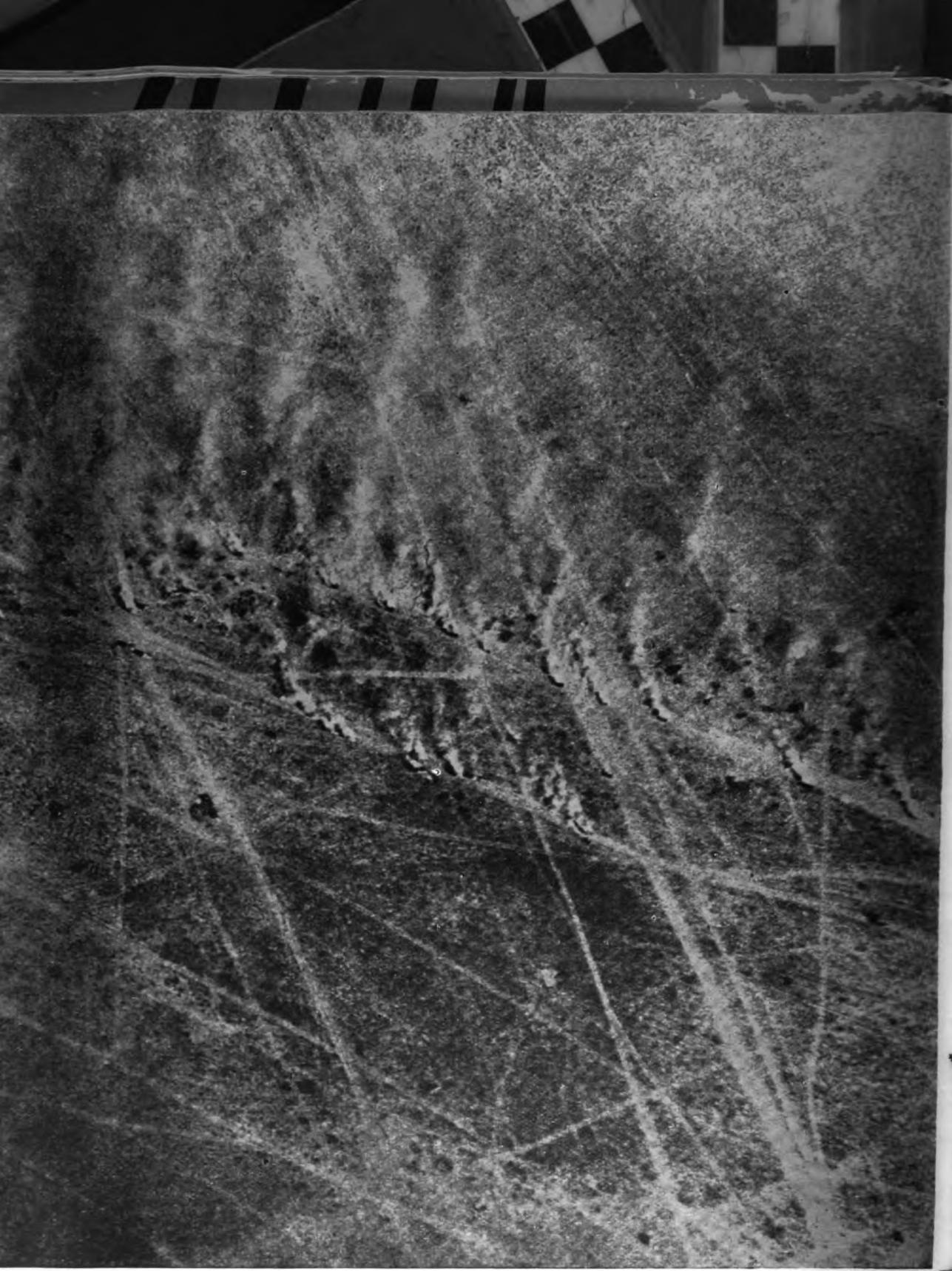
airmen, for although the Italian air force was numerically the stronger, the Luftwaffe did nearly all the fighting. To a daily total of about 150 sorties the Italians contributed an average of eight. By July 6th the Luftwaffe had lost 210 aircraft as compared with 39 Italians destroyed. During those 23 days they lost 93 of them, 45 more were probably destroyed and nearly 100 damaged.

The panzers which had struck north towards El Adem were not happy. The British armour facing them did not break, the whole of the line from Gazala to Bir Hakeim held firm except for a small gap which the Germans had captured in the minefields, through which truck columns were trying to supply the tanks. The area to the east of this gap was that in which the heaviest fighting was taking place. It was nicknamed the Cauldron, and the light bombers and fighter-bombers proceeded at once to stir it. The attacks ranged backwards and forwards across the Cauldron and into the minefield gap beyond. As the bombing increased, vehicles on the ground were seen to swerve into a panic, to bump into each other in this narrow territory, to turn blindly into the minefields and blow up.

By June 1st the enemy position was critical, but on that day, under cover of a sandstorm, they contrived to widen the two gaps into a channel 10 miles wide. They overran Sidi Mustah ridge and fortified their bridgehead through our minefields. Before they could

met by our armour from Knightsbridge and by bombers and fighters based on the airfields round Gambut.





Bomber target. By June 1st, Rommel was struggling to bring supplies to his forward armour. An enemy column passing through the minefields north of Bir Hakeim lashes the desert dust into thick clouds.



Bomber attack: the Cauldron is stirred. Enemy tanks and transport swerve and flee as the bombs strike. The sand is furrowed like the sea as the blast passes over it.



To reduce Bir Hakeim, Rommel flung in every Stuka he possessed. A German airman took this picture as the smoke clouds rolled over the foxholes etched in the face of the desert. The Stukas were cut to pieces by the R.A.F.

advance any farther, Bir Hakeim, the southern strong-point garrisoned by the Free French, would have to be overrun.

The Luftwaffe opened the assault. Every available Stuka was collected to bomb Bir Hakeim under the strongest possible fighter cover. Here was something that the R.A.F. would not tolerate. The pilots of the fighter squadrons had been moved by the gallant defence of the French. To many it seemed that in this one facet of a single battle the true France had been reborn. So the R.A.F. adopted Bir Hakeim. Of the seven Stuka parties which were intercepted and cut to pieces during the 23 days, most of them

were over that garrison. Of the Stukas alone, 23 were destroyed and so many more damaged that at one time the Germans had insufficient to put a single Stuka raid into the sky. They had to bring Ju.88s hurriedly from Crete to fill the gap.

Nor was the air aid to Bir Hakeim confined to shooting down its raiders or forcing them to jettison their bombs in the desert. German supply columns approaching the place were incessantly bombed and machine-gunned by the Kittyhawks; in one day alone, June 6th, they knocked out some 70 vehicles. At night the Hurricanes and the lumbering transport Bombays

flew over the garrison and dropped them supplies. And as the fighter pilots admired the staunchness of the garrison, so the French soldiers in their turn vaunted the airmen. General Koenig, their commander, sent a signal to the Desert Air Force: "Bravo. Merci pour la R.A.F." Air Vice-Marshal Coningham replied cheerfully, "Bravo à vous. Merci pour le sport."

In the end Bir Hakeim fell, but not to the dive-bomber. Continuous shelling from heavy artillery which had been brought into range, combined with the dwindling of supplies to a garrison now completely surrounded, eventually reduced this expanse of bare desert which had, nevertheless, made for itself a name. The French did not allow it to be overrun. On the night of June 10/11th they broke out to the south, some 3,000 men of the garrison getting away to fight again.

From foxholes such as these, the Fighting French defended Bir Hakeim for 15 days. The fort fell, not to assault from the air, but to artillery bombardment and from shortage of supplies.



It could not have been otherwise, but it was the turning-point of the battle. For the first time the panzers had cleared their rear and had space to disperse away from the incessant bombing attacks. They could afford to push hard at the British positions farther north and north-east. Hard and heavy battles were fought against the Knightsbridge crossing of the two big desert tracks, and against El Adem, south of Tobruk, where the airfield lay.

In this stage the whole weight of air assault was flung against enemy formations directly attacking our troops. Hour after hour the Bostons and the Kittyhawks went out on a shuttle service of bombing, returning to refuel, rearm, gulp a cup of chlorinated tea and take off to bomb again. The distances they had to fly were getting so short that they referred to these flights as "tram-raids." The landing grounds shimmered in the June heat under a constant cover of dust kicked up by the take-offs. Beneath it every man of the force worked each hour of daylight and far into darkness. The ground crews abandoned their tents and dug themselves holes in the ground beside their aircraft in the dispersal areas; they flung themselves wearily into these holes to get about four hours' sleep out of 24—the rest of the time they were working. After darkness they muffled their heads in blankets and worked on their aircraft by the light of pocket torches. They worked through heavy bombing raids in which the enemy were using peculiarly unpleasant anti-personnel missiles known as "butterfly bombs." The armourers toiled at the guns; the refuelling parties scarcely dismounted from their bowsers, living day after day in one long reek of petrol.

The aircraft losses which we were suffering could not be replaced in time, but by incessant work the ground crews increased the number of possible sorties by actually forcing up the serviceability figures beyond those which are expected from squadrons in ideal conditions on permanent stations. Yet these men did it through midsummer heat in the clouded dust of the desert. The pilots and aircrews flew, fought and flew again without time to shave their beards or change their clothes.

Many of the Boston crews made three and four bombing raids each day. Two squadrons of Kittyhawks flew every serviceable aircraft they possessed, in this month and the next, an average

of 2½ times a day for 61 days. In their periods of rest the airmen took to the scant shade of the tents, talking of nothing but tactics—how best to apply the lessons they had just learned. Their clothes were tattered, some of their shirts were ripped, their hair and sprouting beards were clogged with sand; but their deeds were done with determination and a cheerfulness that did not fail. They improved so consistently on their technique that, by the end of the 23 days, the period of time which elapsed between a call from the Army for support and the arrival of the Bostons over the target was brought down to 35 minutes; if Kittybombers went alone it was considerably less.

Throughout this hammering period the armoured cars of the R.A.F. patrolled unceasingly on the very edge of tank battles, signalling back where the best targets lay, standing out in the open to watch the bombing attacks which followed, reporting back to base

Two new weapons attacked Rommel's armour from the air during these days of bitter fighting. The first was the fighter bomber—a Kittyhawk bomber is being fitted by the stained and dusty ground crew.



what results had been achieved. Frequently they had brisk skirmishes with the enemy, who never succeeded in driving them away. Throughout the bid for Egypt, the R.A.F. armoured cars put up a screen in front of the airfields.

This air-force effort had a strong effect on the battle. Formation after formation of German columns was broken up. In one day air attack alone completely dispersed four separate attacks on El Adem. The Army Commander, General Ritchie, sent a personal message of thanks to the squadrons.

During this battle the R.A.F. sprang another surprise weapon on the enemy—a tank-buster. The existence of these aircraft was kept a tight secret at the time and for long afterwards. In a series of experiments it had been found that the sturdy Hurricane, already used as a fighter and a fighter-bomber, could carry two 40 mm. guns firing shells of a similar weight to those of the Bofors A.A. gun. A veteran desert squadron was withdrawn to train on these tank-busters, learning to fly in at almost ground level and to control the violent kick when the guns were fired. They came back into the desert during the German assault and tried their guns on the enemy tanks for the first time on June 6th. By June 16th they had made 37 sorties, in the course of which they had immobilised 31 tanks and destroyed or severely damaged 28 large vehicles, some of them troop carriers. It had long been known that it was useless to attack tanks with the guns that aircraft usually carry, but the heavy shells of the Hurricane tank-busters penetrated armour-plating of great thickness. The pilots never claimed to have destroyed a tank. If they hit it, they knew simply that a heavy projectile had pierced and often penetrated clean through it. They claimed that that tank had been stopped.

In spite of these blows the Panzers established themselves on the escarpment at El Adem by June 13th, and it became necessary for our troops holding Gazala to make their way out. For some three days the road out of Gazala was packed solid with our columns. Fighter squadrons were detached from the main battle to protect them against inevitable bombing. Never was our air superiority more clearly shown. In all those three days our land forces suffered just six casualties from air attack. Compare that with the 1,050 enemy vehicles which our aircraft destroyed in the first few days of the battle.

THE FIGHTING RETREAT



The tank buster was the second new weapon—a surprise sprung upon the Afrika Korps as it raced north from Bir Hakeim. The Hurricane II D was fitted with a 40 mm. automatic cannon under each wing; the heavy shells could pierce and stop a tank.

6—The Struggle for the Sea Routes

AT THIS climacteric of the battle, air power had to be exerted, not only above the dust of the tanks in the desert but over ships at sea. It was necessary to get ships to Malta at whatever risk. Two convoys were therefore dispatched at the same time, one from Gibraltar in the west and the other from Haifa, Port Said and Alexandria in the east. Something more significant developed from these convoys even than supplying Malta. For the first time a full-scale battle was fought between Allied air power and enemy sea power in the Mediterranean—the aircraft against the warship.

It is necessary here to step back a little in time. There were always air campaigns being waged simultaneously in different parts of the Middle East, and they all dovetailed into a complete air war on a single plan. But for clarity they must be described separately.

Since the chief aim of the whole Middle-East war was to gain air control of the Mediterranean sea routes, with all the benefits such a control implies, a considerable air strength had been accumulated to fight over the Mediterranean itself. It worked from two sides, the North African coast and Malta. As the desert war gave us or denied us airfields along the Libyan coast, and as the Luftwaffe's blitz on the Malta airfields waned or waxed, so the power of this air strength increased or declined. In the early days it had consisted of no more than a squadron of Sunderland flying-boats, but gradually came reinforcements. By the spring of 1942 the air force over the sea was considerable in numbers, technically well equipped and efficiently trained.

It included one Wellington squadron of particular interest, which greatly increased our power of hitting ships at sea. What was wanted was an aircraft that could carry at least one torpedo over many hundreds of miles of sea. Since the only long-range bomber then available in the Middle East was the Wellington, one squadron was given the experiment of fitting torpedoes instead of bombs. The squadron was asked to transform an aircraft that normally bombed from a height of many thousands of feet into an aircraft that could deliver torpedo attacks

at night from only a few feet above the sea.

It was done, largely by men of that one squadron, with a little help from other engineers, on a sandy airfield in the Canal zone. The engineering side of it alone meant many changes in the Wellington, for when two torpedoes were hung on it the whole balance of the aircraft was upset. Very soon however the squadron produced a torpedo-carrying aircraft that would fly. Then the crews trained themselves to deliver attacks with dummy torpedoes at a small yacht—a difficult technique with which none of them was familiar. All the time, part of the squadron carried on with the normal bombing of Benghazi; yet within three months they had added a long-range torpedo force to the strength of the Middle East. Wing Commander J. H. Chaplin, D.S.O., D.F.C., who commanded the squadron, was the man who shaped this new weapon and scored the first success with it.

Never did the air forces which attempted to control the Mediterranean work in harder circumstances than during the spring of 1942. Even with an advanced landing ground at Bu Amud, actually in front of the desert fighter squadrons, the force based in Egypt under the command of Air Vice-Marshal Sir Leonard H. Slatter, K.B.E., C.B., D.S.C., D.F.C., could barely reach the enemy's main shipping routes from the African coast. At the same time the Luftwaffe was making the heaviest continuous air assault of history on the few airfields that were in range—those of Malta.

The epic of Malta's defence by men of all three Services and by the endurance of the civilians, from the unearthing from packing-cases of four Sea Gladiators in the first days to the climax of 1942, cannot be given justice in such a short account as this. It needs a separate book. The offensive power of Malta, however, the way the island struck back, is an integral part of the Middle East air story.

Malta, an island of only 120 square miles, lay at a distance of 60 miles from the nearest enemy in Sicily, and at that time was some 600 miles from the nearest friend in Cyrenaica. On clear days the coast of Sicily can be seen

THE FIGHTING RETREAT

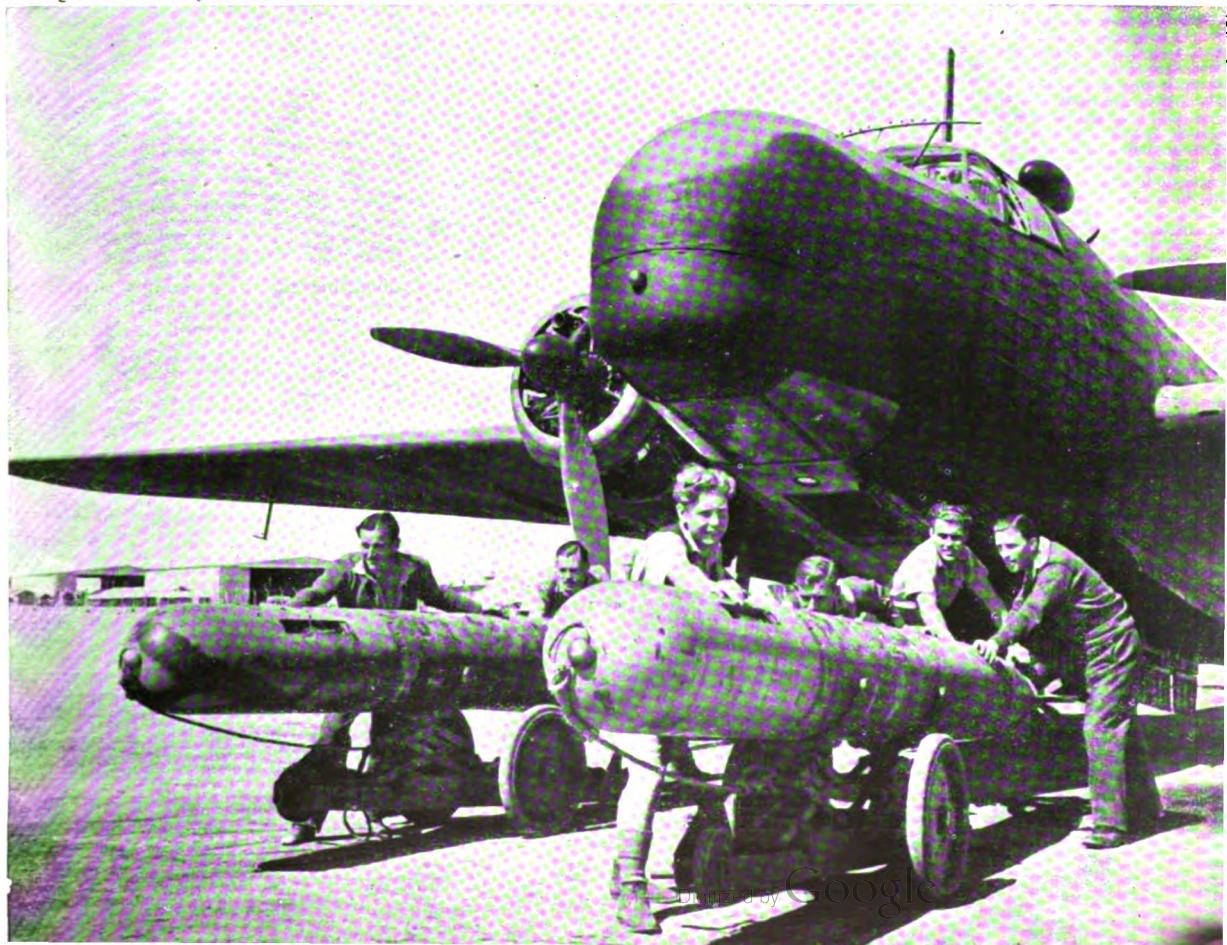
without the help of binoculars from the Maltese cliffs. On this small island are scarcely more than half a dozen compact targets of military significance, the chief being the port of Valetta and the few airfields from which parts of all the sea lanes for the reinforcement of Libya are within bomber range.

On December 19th, 1941, the Luftwaffe had decided to knock out this air threat to supplies which were then vital if Tripolitania were to be saved. In the 13 weeks from February 25th to May 25th there were nearly 11,000 sorties by enemy aircraft against Malta—a sortie is one flight by one aircraft. Rather more than half of them were fighters, the rest bombers. Those three months were the peak for Malta. During them it was decided whether the island would stand or fall.

Yet even under this bombardment the few

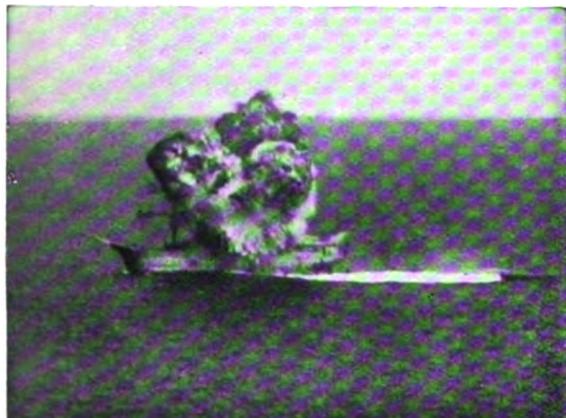
bombers of the R.A.F. that remained on the cratered airfields, serviced and maintained by ground crews who can read the stories of Dunkirk, Tobruk, Sebastopol and Stalingrad without embarrassment, still struck back at the enemy. Their most successful blow was during the night of March 2/3rd when 16 Wellingtons, taking off and landing as the bombs fell, attacked Palermo harbour where a large supply convoy of ships was assembling for the run to Benghazi. The crews watched a ship of 9,000 tons receive a direct hit and catch fire, and several other fires broke out in the same area. When a reconnaissance aircraft flew over to take photographs it found that the cargo of this ship was being unloaded on to another vessel, that two ships of 6,000 tons—one of which carried a heavy deck cargo—together with another ship of 2,000 tons, had been sunk and lay on the bottom.

An aircraft which could carry torpedoes over many hundreds of miles would greatly increase our power of hitting Rommel's supplies at sea. It was devised on a sandy airfield in the Canal zone; long-range, high-level Wellington bombers became torpedo carriers which could attack at night, a few feet above the sea.

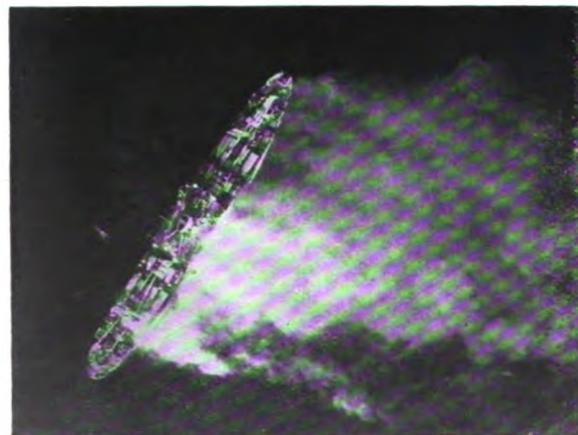




1. Malta struck back throughout the heavy blitz. Bombs and machine-guns sink a tanker off the Tunisian coast.



2. Rommel's oil explodes as a second tanker is attacked by Blenheims off Tunisia. The ship will burn itself out.



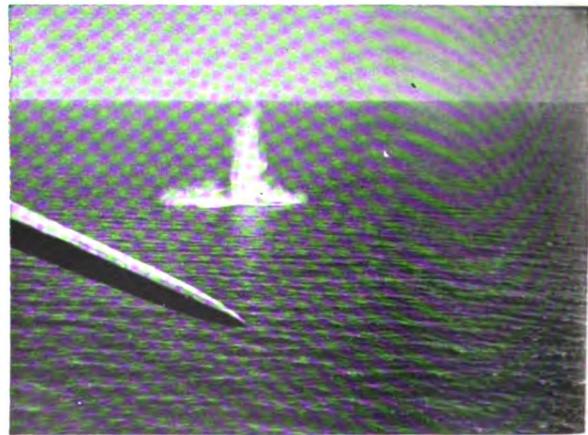
3. A torpedo attack by Beauforts stopped this ship and set it on fire. The deck is packed with M.T. for Rommel.



4. The patrol that never ends. An Italian submarine, surprised by a Sunderland, makes a violent turn to port.



5. As the submarine turns, the bombs strike. Cascades of foam rise as high as a church tower.



6. The upheaval subsides, the submarine emerges. Its casing is damaged near the bows, but it still floats.



Naval Albacores were part of the striking force operating from Malta's cratered airfield during the convoy action shortly to be described, they scored torpedo hits on a cruiser and two d



The major attack begins. An enemy torpedo bomber, its torpedo clearly visible beneath the fuselage, passes over a British cruiser during the western convoy battles of June 14th/16th, 1942.

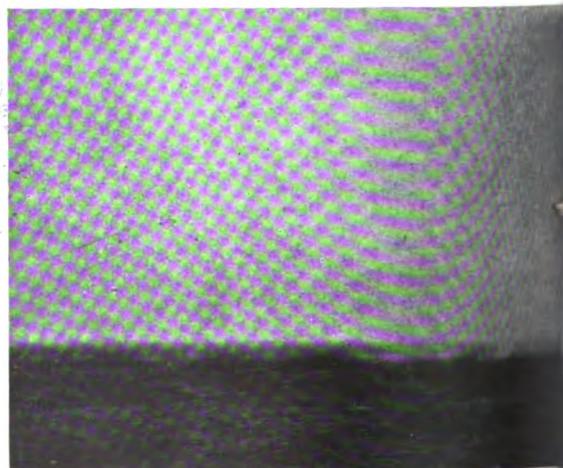
of the harbour with only their superstructure above water.

On the Egyptian mainland, Air Vice-Marshal Slatter's force was concerned with the continual task of protecting Allied merchant vessels which ran along the coast from Alexandria to deliver supplies to Tobruk in order that the Army might be strengthened, or traversed the routes of the eastern Mediterranean along the shores of Egypt, Palestine and Syria. They were all liable to attack, either by bomber or by submarine; and although most of them reached port unharmed, there were some losses, chiefly on the Tobruk run. A large number of Italian submarines were working in the Mediterranean at that time. Patrol aircraft kept watch for them 24 hours a day—the one patrol that never ends, nor will end until the hunt is ended.

The results of the anti-submarine war are the most difficult of all to assess. Its successes are largely kept secret. But it can be said that of the many attacks made at this time on submarines by aircraft, mostly close inshore between Daba and Tobruk, several were successful. Nevertheless we lost some ships to submarines on the Tobruk run, and some more to aircraft in Tobruk harbour itself. Two of them were hospital ships. The "Somersetshire," hit by a submarine's torpedo on April 7th, managed to get into Alexandria

under her own power two days later. The 'Ramb IV,' bringing back wounded from Tobruk, was bombed by a single aircraft near Alexandria on May 10th. She was set on fire and a number of the wounded men were killed. After the survivors had been taken off, the hospital ship sank.

Most of these losses were due to the fact that the enemy held more of the commanding airfields than we, and that, although Malta could not be



Two large formations

THE FIGHTING RETREAT

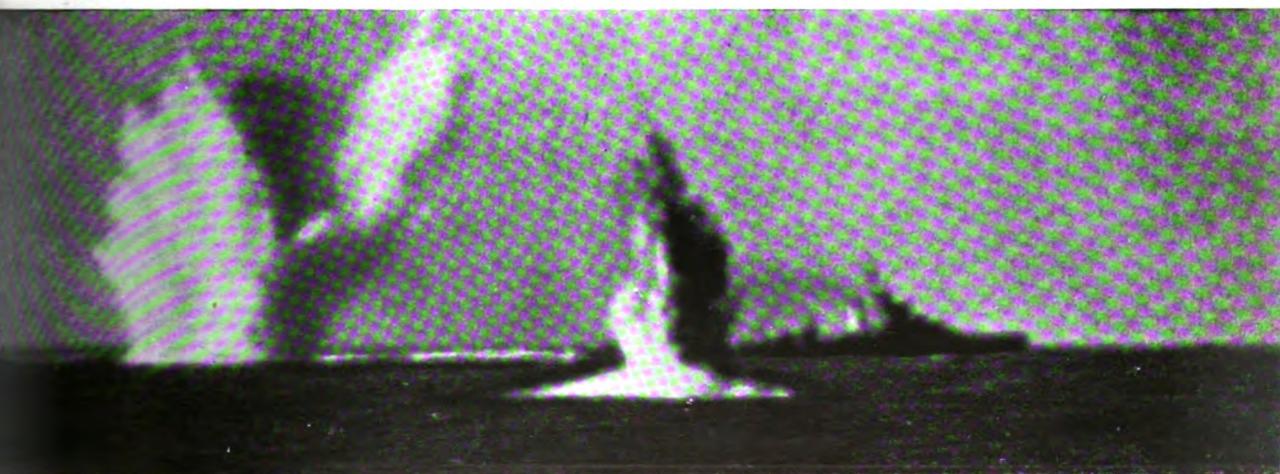
beaten even by the big enemy air force which was concentrating on it, the airfields there were largely useless for anything but local defence. As a result the enemy were able to run a good many of their own ships through from Europe to Africa, though not without some losses.

On April 14th it was known that an important enemy convoy was at sea. Owing to the blitz on Malta, several Marylands and Blenheims had to be briefed to search for the convoy from Bu Amud in Cyrenaica. The crews knew that, if they sighted and shadowed the ships, petrol consumption would compel them to land in Malta under the heaviest enemy fighter sweeps. One of the Marylands, piloted by Flying Officer J. B. Halbert, sighted the convoy a short distance from the east coast of Sicily, steaming in the direction of Tripoli. Its importance was evident from the fact that two of the four merchant vessels were of 10,000 tons each, with an escort of five warships. The Maryland shadowed the convoy until its petrol was nearly exhausted, sending from time to time clear and valuable reports of its progress. It then tried to make Malta, but was shot down four miles from the coast, all the crew being lost.

The information signalled by the Maryland was the basis of an attack by eight torpedo-carrying Beauforts and four escorting Beaufighters. This force was also compelled to take off from Bu Amud to attack a target at a distance

of 500 miles over the sea, with the knowledge that a landing would then have to be attempted at Malta. On the outward journey the leading Beaufighter shot down two Me.110s and damaged a Ju.88. Owing to a mischance the Beauforts overshot the target without having seen the ships, although the Beaufighters had sighted them. A little time was wasted while the Beauforts came round to search for the ships again, during which a force of more than 100 Me.109s was taking off from the Sicilian coast, 120 nautical miles distant. It was through this fighter screen, coupled with heavy A.A. fire from the ships, that Flight Lieutenant J. M. Lander, D.F.C., led the Beauforts in a low-level torpedo attack. Three hits were scored on the merchant vessels, including both those of 10,000 tons, and a destroyer which was hit is believed to have sunk.

While the attack was still in progress, two of the Beauforts were shot down. The remainder, fighting off innumerable Messerschmitts, turned towards Malta, over which yet more enemy aircraft were keeping standing fighter patrols. Within sighting distance of the island three more Beauforts were shot down. Some of the crews saved themselves by swimming ashore, some were picked up by the air-sea rescue launches of Malta, some were killed by Messerschmitts which dived and shot them as they floated helplessly in the sea. The other Beauforts reached Malta safely, though badly damaged. The



dive-bombers attacked the convoy before dusk. Bomb-bursts tower like icebergs above a British destroyer escort.

leader which, with its gun turret out of action, had dodged some of its pursuers by flying close under the cliffs of Malta, landed without hydraulics, with the rudder stripped of fabric for three-quarters of its length, and with the port wing damaged by striking the water when a cannon shell forced down an aileron.

All this gives only an indication of the intensity of the air war which was continually waged over the Mediterranean. It reached its first peak in the aircraft-*versus*-warship battle, which developed during the very heat of Rommel's land attack in the Western Desert, described in the previous chapter. It emerged from the protection of those two British convoys which we were forced to send towards besieged Malta in June 1942—one from the western end of the Mediterranean, and one from the eastern.

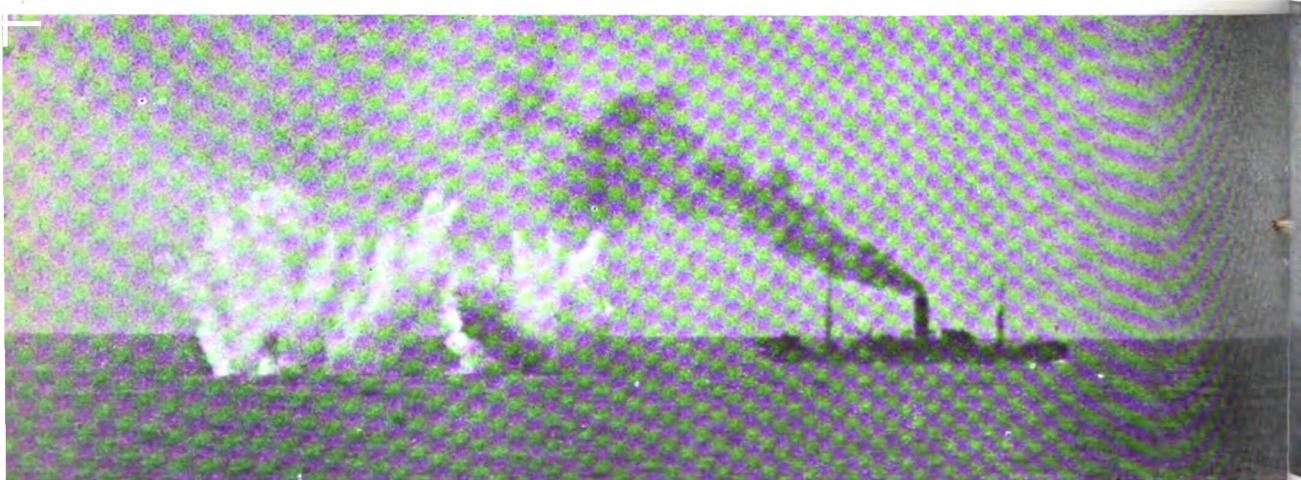
The story of the Gibraltar convoy is soon told. This convoy of merchant vessels, with a strong naval escort including a battleship, passed Gibraltar on June 13th without incident on that day or the next, except for an ineffective bombing attack. At last light on June 14th, however, a Spitfire on reconnaissance reported two cruisers and four destroyers leaving Palermo. Soon after dawn the following day these warships opened fire and the escort signalled for an air attack to be made on them from Malta.

As will be seen, so much was going on farther east in the Mediterranean that there was a scant force of strike aircraft on the island at the time—

two Beauforts with crews far from experienced and four naval Albacores. These aircraft were assembled and sent out against the Italian warships with a cover of 16 Spitfires to hold off a swarm of Messerschmitts. The Beauforts led the torpedo attack, hitting the leading cruiser and setting her on fire. After them came the Albacores which hit and severely damaged one of the escorting destroyers. The Italian surface force withdrew without any further attempt to sink the convoy. Albacores had another try for the warships during the afternoon. Once again they scored two hits on a cruiser and a probable on a destroyer.

This phase of the aircraft-warship battle was definitely our victory, for at the cost of one Albacore, considerable damage had been done to the Italian ships, whereas our own were untouched. But within an hour or so the major attack developed, this time from the air. Before dusk two large formations of escorted dive-bombers had inflicted damage which slowed up the whole convoy considerably during the night. Whereas it should have been only 110 miles from Malta next morning, within range of the protection of Spitfires, in fact it was still 140 miles away; the Spitfires covered it nevertheless, straining their petrol endurance. Once under the protection of their guns the ships were damaged no more.

The Spitfires and a few Beaufighters fought all day for the sky above, shooting down 13, probably



The convoy fights through. After three days of incessant sea and air fighting, the convoy, with

THE FIGHTING RETREAT

destroying four and damaging another 13 enemy aircraft which still clung to the attack. We lost five Spitfires but saved four pilots. The warships and the convoy with some losses came into Valetta harbour, bringing at least some of the supplies which Malta needed for existence.

It was over the convoy from the east that the major air-sea battle developed. The merchant vessels in this convoy were guarded by many cruisers and destroyers. They sailed from various ports on June 12th and made successful rendezvous north of Egypt, steaming west. By the morning of the 14th the convoy ran suddenly into great danger. When the ships were in "bomb alley," between Crete and the mainland, about 25 Stukas, some Ju.88s and a dozen Me.109s were reported to be on their way to attack. Air Vice-Marshal Coningham tore away eight Kittyhawks and 15 Tomahawks from the critical desert battle and scrambled them over the convoy. They intercepted the enemy formation north-east of Tobruk, and although they shot down only one Stuka for certain, they forced all the bombers to jettison their bombs harmlessly in the sea. Further bombing attacks were kept up all that day and fought with great determination by Kittyhawks and, later, Beaufighters.

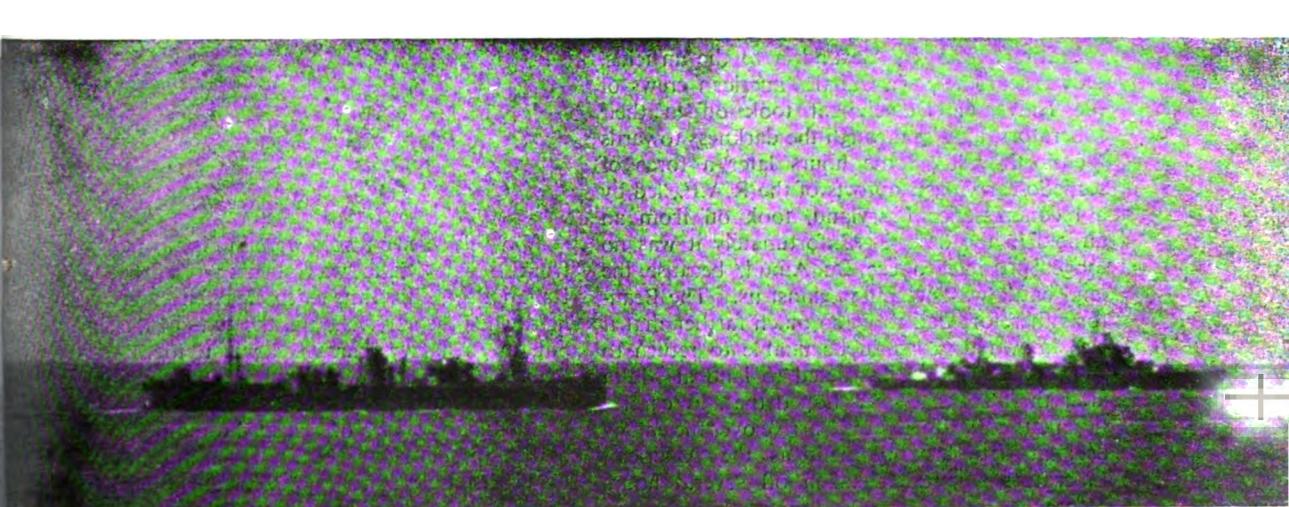
Meanwhile another character had appeared in the cast. Ships of the Italian fleet were putting out from Taranto into the Ionian Sea. Throughout June 14th, Baltimores from Malta swept

back and forth over the water looking for them. One Baltimore saw two battleships, four cruisers and eight destroyers about 70 miles south of Taranto, steaming south. Just as darkness was falling, a photographic Spitfire sped across Taranto harbour and confirmed that the main enemy battle fleet had sailed, headed by the Littorio-class battleships.

These reports were sufficient to start the whole air machine into motion, both from Malta and from the African coast, during that short June night and the following day. The Commander-in-Chief, Mediterranean, signalled the convoy to turn east during the small hours of the morning, leaving the waters clear for an engagement between our aircraft and the Italian battle fleet.

Soon after nightfall on June 14th, the crews climbed into three Wellingtons on the bomb-torn runways of Malta and took off to search for the warships. Five more Wellingtons were being prepared on an airfield in the Western Desert to complete the search from the south. They were all airborne by 10 o'clock at night, except one that burst a tyre.

The combined operations room in Alexandria where the air and sea commanders spread their charts beneath shaded electric lights in the silent heat, controlling the ships and the aircraft manoeuvring through the night, waited anxiously for news—the brief signal of a sighting report, the result of an attack. They knew where the Italian fleet had last been seen and roughly where it was



some losses, reached Valetta. The enemy lost 43 aircraft destroyed, 22 probably destroyed.

likely to have reached; they knew where, farther to the east, the convoy that was attempting to reach Malta steamed slowly through the night in the opposite direction, relieved during the darkness of the scream of dive-bombers but peering steadily across the waves for the faint, luminous feather of a periscope's track. They marshalled from widely separated airfields, where cigarette smoke thickened in the small crew-rooms and mechanics stood quietly by the waiting bombers, a force for the attack. Signals were written and passed out. The airfields stirred, propellers swung, the lamps of flarepaths switched on, one by one the bombers took off.

Malta had already sent a second force of Wellingtons, carrying torpedoes, to search the central waters of the Ionian Sea, striving for the glimpse of a ship on the dark water. In the early hours of the morning they found the battle fleet, nearer the coast of Greece than that of Sicily, steaming south. The Wellingtons circled it, preparing to run across and launch torpedoes. The enemy destroyers wheeled swiftly round the battleships and cruisers, laying a thick smoke screen through which some of the Wellingtons managed to attack, with what result they could not see. They reported only that there was a glow on the water beneath the clouds of smoke.

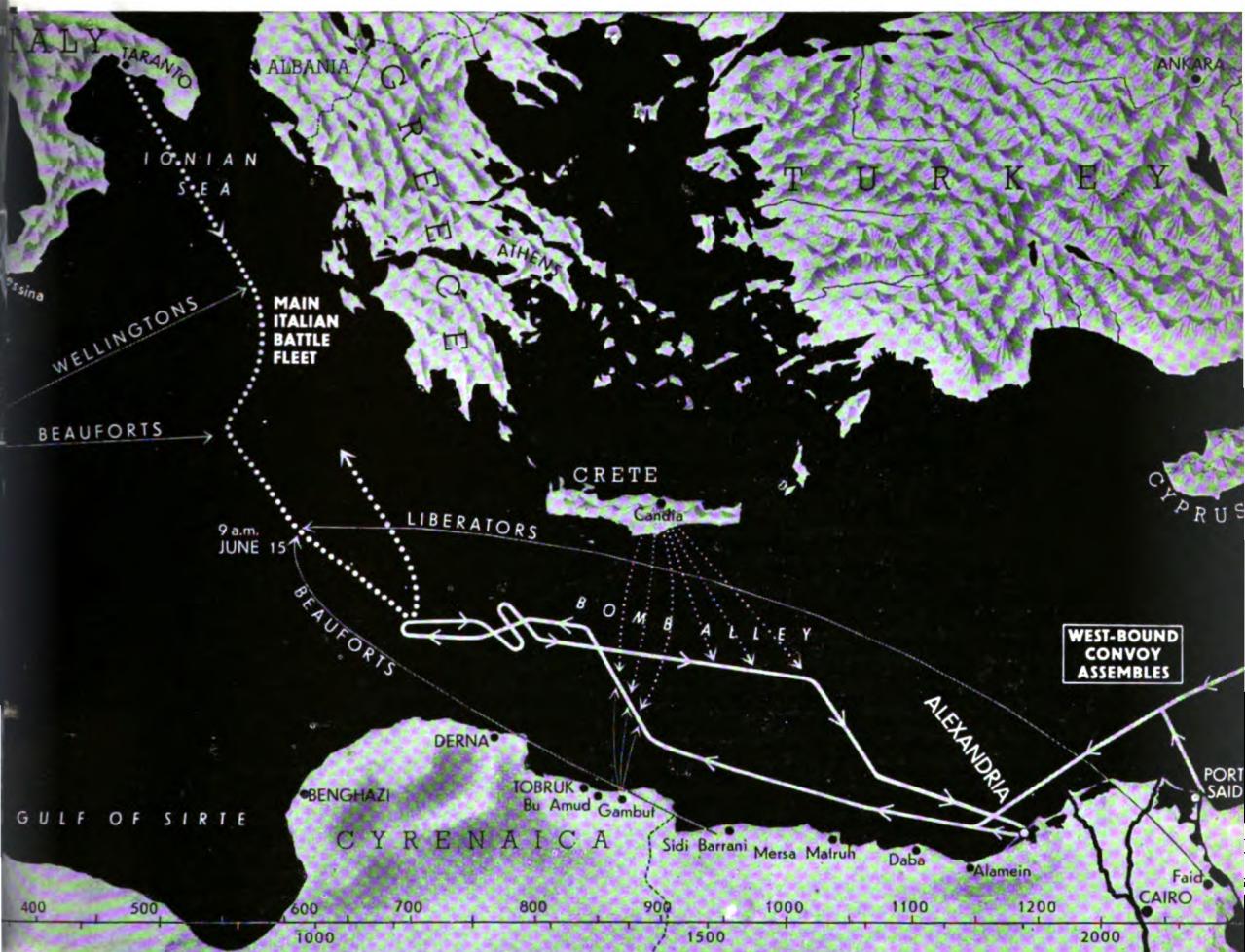
Now it was urgent to direct the strongest possible attack against the fleet. If it were not checked, it might overtake the convoy which had been turned to the east. There seemed scant hope of getting any of the ships through to Malta. It was of first importance to save them.

More signals passed from the combined operations room in Alexandria to the airfields. Down near the Suez Canal, American crews of the Halverson Detachment took off in their Liberators, aiming through the darkness towards the north-west. Some hours later a force of torpedo-carrying Beauforts of the R.A.F., led by a reconnaissance Maryland, took off from an airfield in the desert. Unfortunately it was no longer possible to use Bu Amud, because the land battle was swinging against us. The Beauforts therefore had to fly so much farther that it was known they would be unable to return to Egypt. They were instructed to land at Malta after the attack. It was hoped that, by careful timing, the Beauforts would arrive over the enemy fleet at the same moment as the American Liberators which had taken off several hours before.



While these two forces were in flight outwards from Egypt, Malta was striking again at the Italian fleet, this time with Beauforts. It was light when they arrived, and the guns of the ships put up a heavy barrage against them. The Beauforts flew in low, releasing their torpedoes. One struck a destroyer of the outer screen. It listed heavily. Two others sped on and struck a battleship, damaging but not sinking it. The Beauforts circled through the curtains of shellfire and all returned safely to Malta. One Beaufort,

THE FIGHTING RETREAT



Air power v. Sea power: a trial of strength. Two testing, hard-fought actions, waged round convoys to Malta when the air-sea struggle in the Mediterranean was at its height. Thin lines represent R.A.F. operations, thin dotted lines air attacks by the enemy.

getting separated from the formation on the outward journey, arrived alone over the battle fleet. It nevertheless went in alone to the attack through the concentrated fire of the whole fleet, and launched its torpedo at a battleship.

At dawn on June 15th the two striking-forces from Egypt were both still flying over the sea, the Liberators at a great height, the Beauforts close down on the water, separated by many miles from each other. Spread out in a screen ahead of them were all the sea-reconnaissance aircraft of the

Middle East, searching for the exact position of the warships. By early morning two of them had sighted all the warships that were believed to be at sea. By then the ships had worked well down into the centre of the Mediterranean north of the Gulf of Sirte. There were in all two battleships, three cruisers and 11 destroyers, split into two forces, one large and one small. It was the larger force around the battleships that was to be attacked.

Soon after 9 o'clock in the morning the

Liberators sighted the target. They ran across at a good height, the bombardiers adjusting bombsights which can place a bomb with remarkable accuracy and were to make a considerable difference to the Middle East war. It was one of the earliest battles which the American Liberators had fought and their first notable success. They scored four direct hits on a battleship and a cruiser, and a number of misses close enough to be likely to do some damage to other ships. It was thought however that these hits had done no more than superficial damage not affecting the main structure of the ships. On the way home the Liberators shot down an Me.110.

Even as the Liberators were dropping their bombs, their crews could see, close down on the water, the Beauforts flying in to release their torpedoes. At a distance of several hundreds of miles over the sea, starting from airfields hundreds of miles apart at an interval of several hours, with part of the flight in darkness, the hoped-for perfect synchronisation between the Liberators and the Beauforts had been achieved.

Of the 12 Beauforts which had taken off from the desert landing ground, only five had arrived. On the way they had been attacked by Messerschmitts and two of them shot down into the sea. Five more were forced to drop out of the flight after the combat, for their crews had been wounded, their mechanism damaged; all these returned safely to Egypt, save one which was last seen heading towards Malta. With his depleted force the leader, Wing Commander A. J. Mason, D.F.C., nevertheless made a torpedo attack through the ferocity of the A.A. barrage of the battle fleet. They scored one certain hit on a cruiser and one probable on a battleship, then flew safely to Malta. The attack was made easier by the Italian warships themselves which, bombed from above and torpedoed from sea level, turned their broadsides to the Beauforts in a confusion in which two of the destroyers seemed in great danger of colliding.

For the rest of the day the air task was to shadow the battle fleet. At first it continued to sail south-east, but by late afternoon it had suddenly turned to the north-west. Another force of torpedo Wellingtons sped it on its way with one more hit on a battleship through a smoke-screen at dusk, and by June 17th an aircraft photographed the fleet back at Taranto, battered and damaged, and short of one cruiser

and one destroyer which had sunk. It had suffered part of this damage from submarines of the Royal Navy which, of course, were equally as vigilant as the air forces.

With this threat out of the way, it had to be decided in Alexandria whether or not the convoy could still make Malta. At first the fastest merchant vessels were turned west again, but soon it was decided to recall all of them to Alexandria. During the period of delay, in which they had been continually attacked from the air with some losses, the ships had spent so much fuel and ammunition that it was doubtful if they could face the aerial bombardment which would await them in the approaches to Malta itself.

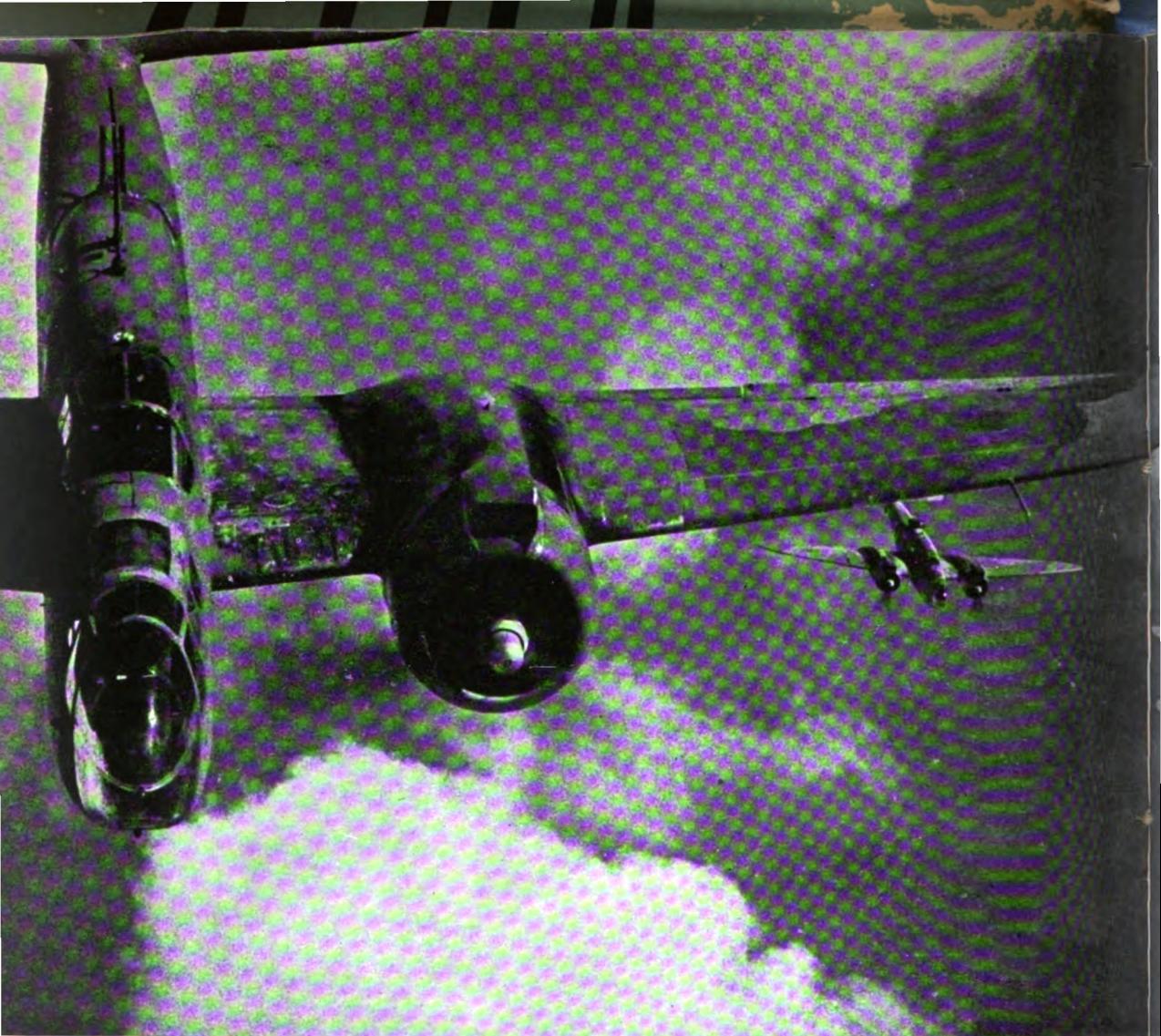
It is difficult to assess which side won this battle. The convoy part of it was a failure; of that there can be no question. The ships did not reach Malta, several of them were lost to bombers and submarines, and the fighter force which we could spare from the desert battle to protect them also had heavy losses, although it inflicted equally heavy losses on the enemy aircraft. The Beaufighters suffered in particular. One crew had an extraordinary adventure. They were shot down into the sea with all hatches closed. The observer got out on the surface, but the pilot sank with his aircraft. He could not undo the hatch and had given himself up to death. He sank so far that pressure burst open the hatch and brought him to the surface in an air bubble, at the same time tearing from the wing a petrol tank almost empty of fuel. The pilot put the observer, a poor swimmer, on to the petrol tank. He pushed him ashore in a swim that lasted for 10 hours.

The significance of this operation was not truly the passage of the convoy, however, but the battle it brought about between the Italian fleet and the air power of the Middle East. Of the whole fleet only one cruiser and one destroyer were actually sunk, but air power combined with a submarine attack which scored one hit had forced a powerful surface fleet to put back into harbour without reaching its objective. The air power employed was not strong, since it had to be diverted from the most critical days of the Western Desert battle. The repulse of our convoy by the Luftwaffe and of the Italian fleet by the R.A.F. were both reassessments that the control of the Mediterranean Sea lay in the power of aircraft based on its shores.



R.A.F. rendezvous. Crews of the Liberators (above) and Beauforts detailed to attack the Italian fleet simultaneously. They flew from airfields hundreds of miles apart, starting at an interval of several hours, for some time in darkness and through attack by enemy fighters. As the Liberators were dropping their bombs, their crews saw, close down on the water, the Beauforts flying in to release their torpedoes.





7—The Shield above the Army

WHILE THESE inconclusions were being tried at sea, the battle was failing us in the desert. On June 15th the German armour drove swiftly again to the east, taking Belhamid and leaning on Sidi Rezegh—that luckless stretch of barrenness destined for tank battles. It is necessary here to be provident of superlatives to describe what the Bostons and the Kittyhawks did to check the enemy advance; they will be needed

later. Just say that men, who had bombed and fought all day and each day for three weeks, now bombed and fought the harder; that the sand-wake of fighters taking off drifted across the desert more often, the intervals between the drone of bomber engines lessened; that men holding control columns steady in the air and men gripping spanners on the ground wielded them for longer hours, more vigorously. The tent which



housed the operations control on the Bostons landing ground was crowded from first to last light with crews coming in, crews going out, sand-plastered men, unwashed, unshaven and untiring, calmly discussing with each other some point of tactics, reporting some observed happening on the desert below. Standing back a little from the scene, one of them summed it up by saying it reminded him of a marquee at a busy

motor-race meeting—if only, he added wistfully, there were some champagne.

All this effort on the ground and in the air poured down on the advancing German columns the heaviest weight of bombs to which they had so far been subjected in the desert. It did much to damage them; it slowed down their advance, but it could not halt it. By June 17th the Germans held Sidi Rezegh, their armoured cars drove north to cut the coastal road, the defenders of Acroma and El Adem were forced to withdraw into the fortress of Tobruk.

Late that afternoon a formation of Bostons, which seemed just to have taken off, came circling back round Baheira landing ground. Men on the ground looked up with surprise, wondering why they had cut short their raid. They had not cut it short; their bomb racks were empty. The crews came over to the operations tent to report that an enemy column was scarcely more than five minutes' flying time distant. They guessed it might reach the airfield within an hour. It was clear that the squadrons would have to move back.

The foremost fighter squadrons had indeed already moved that afternoon from the Gambut airfields to Sidi Azeiz. Before they went, they delivered one surprise assault that in itself saved the Allied retreat from any sort of interference by the Luftwaffe.

Reconnaissance had shown that the Messerschmitt squadrons had been moved forward to Gazala, obviously in anticipation of days of murderous ground-strafing as our columns bunched to get back through the minefields and wire of the frontier. Just before dusk Wing Commander H. C. Mayers, D.S.O., D.F.C., led the Kittybombers suddenly back and forth over Gazala, bombing and then machine-gunning. They knocked out more than a score of Messerschmitts where they stood, not destroying them all, but damaging them sufficiently to put them out of action for some few days. Baltimore bombers of the R.A.F. went over at dawn the next day without fighter escort to add to the damage. As a result the enemy fighter activity was nil for the next five days—precisely the respite that the ground forces needed to retreat in good order and with small loss.

When the squadrons had to retreat, they went fighting and they went proudly. They also went methodically. On the night of June 17th/18th there was one fighter wing together with about half of the Bostons on Baheira airfield, now the



As Rommel advanced, the air-brake tightened. A Baltimore, seen through the hatch of another, on the shuttle-service which bombed all day, every day.

most advanced landing ground, the rest of the fighters being a little to the south-east at Sidi Azeiz. They had stayed closer to the enemy on the ground than any air force of such size had done before, in order to give the greatest possible cover to the retreat of the land forces. They were prepared to be and were among the last units of all the Allied forces to withdraw across the frontier. To accomplish this they took considerable risk on the night of June 17th.

There is on Baheira airfield a little underground concrete cell for an operations room: there, when the aircraft were scattered over dispersal areas for the night, some officers collected in the light of a hurricane lamp to receive by signal and field telephone news of the enemy. The camps around the airfield had all been struck, most of the tents bundled into trucks which stood ready to move off at 10 minutes' notice. Men slept beside the trucks, in the shelter of slit trenches.

The messages that came into the operations room were not reassuring. The enemy tanks had not halted with darkness, but were still advancing over the desert, though more slowly by moonlight. The nearest were not more than 15 miles distant. By midnight they were on the escarpment near Gasr el Arid, being engaged by the Free French in the darkness. The moon had

set. An hour later they had come north on to Gambut main airfield, across which a minor battle was moving. By 2 o'clock in the morning they were driven from Gambut and nobody was quite certain whither they had gone. They were said to have turned to the north-east somewhat in the direction of the squadrons immobile on Baheira. Messengers were sent round the truck lines, rousing the sleepers to be ready to move off at first light. At each aircraft the mechanics stood on guard. Here and there in tents the men chewed bacon sandwiches, swallowed mugs of hot tea.

It was a relief when the sun rose, for then it was certain that the aircraft could get away. The German tanks were still 12 miles distant.



THE FIGHTING RETREAT

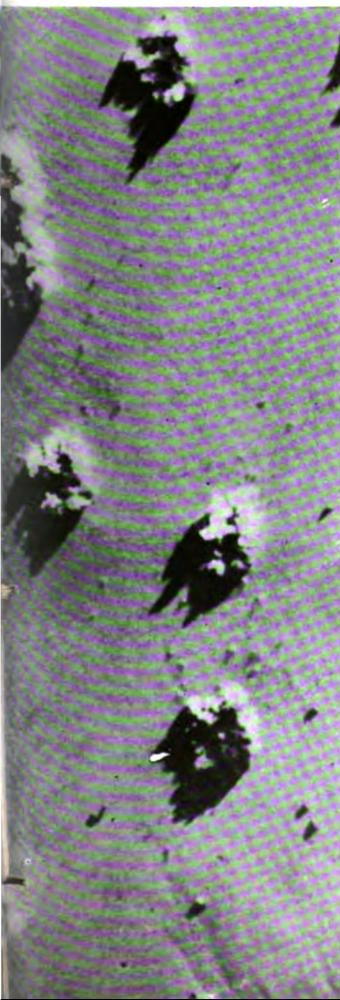
The pilots got into their aircraft and took off for day-long patrols over the retreating forces—patrols on which not a single enemy fighter was met. Aircraft that were normally unserviceable were successfully flown off, one with no instrument panel. There were two Bostons in a sad state. Their ground crews begged to be left behind with a couple of cars, hoping to make the Bostons fly before the enemy arrived, but the squadron commander decided the risk was too great. The two Bostons were fired, the smoke billowing black across a sky already hardening into the blue of the day.

Nothing was left for the enemy. All that could be carried was placed in the trucks to bump across the camel-thorn hillocks to safety; the

rest was destroyed. Officers with picks spilled all the petrol drums. Small parties scoured the landing grounds to salvage any odd things of value that had been forgotten. One man was busily arranging empty beer tins upside-down in a case to give the impression either that they were a booby trap, or even—glorious haul—that they were full.

Behind the squadrons came the salvage parties with their cranes and their trucks, lifting damaged aircraft that could not be flown. One bomber they towed along the Trigh Capuzzo behind a car. The air force left behind on its landing grounds exactly five aircraft, all of which were either burned or had already been damaged beyond repair. Compare that with the enemy's

"An avenue of smoke and sand advanced across the desert, looking like a wide glade of woolly white trees in a Disney forest. Somewhere beneath it crouched the tanks and trucks and men of the enemy."



retreat during the previous winter, when he left more than 200 of his aircraft on the landing grounds from which he fled, many of them scarcely damaged.

It was the same story with the petrol and bombs carried back by the supply and transport columns of the R.A.F. One small column brought back in several journeys 260,000 gallons of aviation petrol and about 300 heavy bombs. The last trucks, loaded under shellfire, got away only by striking out for little-known desert tracks.

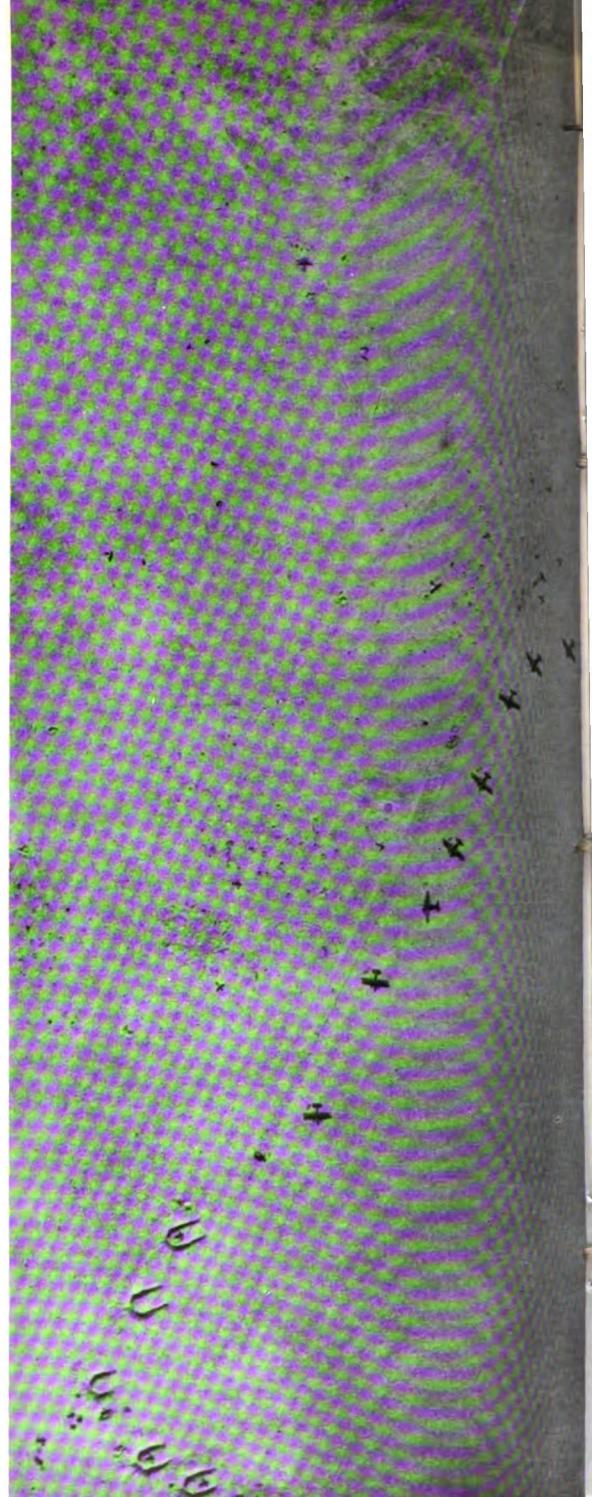
At the gaps in the frontier wire it seemed that every truck in the world had gathered. The whole desert was a moving pattern of trucks, the finest target the enemy strafers had ever been offered. But the only aircraft that flew overhead were Hurricanes and Kittyhawks. The Messerschmitts lay broken on the landing grounds at Gazala.

By nightfall the squadrons were reorganised on new landing grounds behind the frontier. The position was then as if the campaign of the previous winter had never been fought. Our troops were back on the Egyptian frontier with a strong garrison in Tobruk. The fighter squadrons were on landing grounds behind the wire; Tobruk was out of their range, as it had been all the summer of 1941. The squadrons themselves were decimated. Some were down to a couple of serviceable aircraft, a handful of pilots. Several were sent back to base to re-equip and to train in order to start all over again the weary process of 1941, the building-up of supplies, the running of convoys to Tobruk and another big campaign in the autumn. That was what was envisaged.

On June 20th a piece of news went round the desert that was at first condemned angrily as a mischievous rumour, but it was true. Tobruk had fallen. Tobruk with all its garrison and its vast stores. A heavy artillery and air bombardment in which the R.A.F. could not intervene because of range had preceded a tank assault. A few reconnaissance aircraft which had remained inside the perimeter managed to fly out; the ground units of the air force were captured.

It meant that the frontier could not be held. The line south from Mersa Matruh was chosen for a stand. The enemy was up against those defences by June 26th.

Two days previously the air force had been called upon to make an all-out effort. It was evident that Benghazi would soon be out of range





The Luftwaffe gathers for Rommel's last throw. On July 26th, before the Afrika Korps reached Alamein, 112 aircraft were counted on this landing ground at Sidi Barrani. This reconnaissance photograph shows 15 Ju. 52s unloading on the S.W. boundary and 75 fighters dispersed round the perimeter and in the horseshoe shelters (a protection from blast). One is burnt out and another is on fire. Thanks to R.A.F. strafing and weak enemy organisation, it was seven days before this force could intervene on any scale in the fighting.



As the Germans thrust at Alamein, these four men walked into the British lines. Twenty-two days before, their Wellington had force-landed at Tobruk ; they had come 450 miles on foot through hostile desert. It is never too late to come back.

of the Wellingtons, so on the night of June 24/25th that city was given the heaviest raid it had ever suffered. Nearly a hundred bombers took part. Fires were left burning all over the harbour area and the town. It was the last mail run to be made in any strength for many weeks, but it carried a big post.

Next night the medium and heavy bombers turned their attention to the battlefield itself, continuing through the darkness the attack which the light bombers—Baltimore now as well as Bostons—had maintained through the day. The idea was to spread the night bombing as widely as possible in both area and time, to prevent the enemy troops from sleeping and to keep them in continual fear of death. Something approaching 80 Wellingtons were used each night, a good

number of them operating twice in the same night, putting back to their bases to be refuelled, re-bombed and rearmed in the darkness, and taking off again for the desert targets. They did not only bomb; they machine-gunned, diving down almost to ground level to rake the laagers of enemy tanks and trucks, the columns drawn off the road for sleep.

By day the Bostons and the Baltimores with their Kittyhawk escorts flew without cease. There were in fact few moments of the whole 24 hours of each day and night when some part of the enemy's tanks, trucks, supply columns was not being bombed or strafed. It did not prevent them from breaking through the defences of Mersa Matruh, but it slowed them up. Their advance was like the movement of a heavy lorry

on to the wheels of which the air forces were gradually clamping a brake more and more tightly. It was running sufficiently slowly by then to allow our ground troops to take up positions in the narrow bottleneck at Alamein between the sea and the Qattara Depression. The enemy rolled slowly forward to touch up against those defences on June 30th.

Alamein was the last defence line of the Delta. Should it fall, the great supply base of Egypt would most probably pass to the enemy, Malta would necessarily be lost and the aircraft of the Luftwaffe would control the whole of the Mediterranean. Should it fall, who would dare to guess the number of weary months or years which would be added to the length of the war?

That it did not fall is due to the staunch resistance of the 8th Army with its back to the Nile, and to the work of the air force in Egypt during those first six days of July 1942. After some six weeks of fiercest fighting the airmen who were left, reinforced by comrades from the training camps and aircraft that were pouring in through the supply routes and from the repair shops, actually increased the weight of their attack, in collaboration with the British troops on the ground. It was like some athlete, tireless in the middle of a long race, suddenly pulling out a sustained sprint.

On July 1st, the day after his first contact with Alamein, the enemy attacked that position in the north and in the centre, leading with 20 tanks. The light bomber and fighter squadrons were all grouped on a congested series of landing grounds on both sides of the road from Cairo to Alexandria; they seemed merely to have to stretch out one hand to touch the greenness of the Delta fields. From those landing grounds the Bostons and Baltimores took off at first light and continued all day to bomb the German columns. Flying with them as part of the fighter escort went the Kittybombers. Dust was already stirring with the early morning when they reached the target—dust that a moment later billowed up in explosive clouds, through which the Kittybombers dived to add their weight to the bomb load. It went on like that all day. There was little air opposition—only one Me.109 was shot down—but that was partly because other fighter squadrons were strafing the landing grounds near Sidi Barrani, where they destroyed or temporarily disabled 19 enemy aircraft.

When night fell, that first German thrust at

Alamein had been repelled. Their fighting vehicles that retreated were given no pause during the night, for within a few minutes of darkness the Wellingtons were over their camp sites, with naval Albacores flying slowly to drop flares illuminating the desert. At the same time Liberators were flying farther yet, to start what was to become a great offensive against Tobruk. And that night, though attention was concentrated on the desert battle, Wellingtons flew far out over the Ionian Sea to torpedo two of a convoy of supply ships.

Next day the panzer divisions made another assault on Alamein. They were met with the same attack from the air. Dust storms got up in the afternoon and hindered flying for a while; but towards evening, as the British troops counter-attacked, the bombers and their fighter escorts delivered two heavy raids in close support.

July 3rd was the peak. The day-bombing pressure reached a record in the number of sorties flown and the weight of bombs dropped. For the

The Luftwaffe interfered spasmodically to bomb the British advanced supplies. A 2,000-pounder bursts near a water truck in the Tel-el-Eisa sector at Alamein. The men crouch behind for cover.



first time it began to look as though the enemy would withdraw from this immediate assault upon Alamein. Yet on this day the Luftwaffe tried for the first time to interfere on a considerable scale. Its ground organisation, never able to stand the strain of an advance or a retreat as ours did, had managed by then to bring up several squadrons to the forward area.

The day began in the usual way, with the first Boston and Baltimore raids over desert territory still smoking with the fires left by the night Wellingtons. But as they flew out and back they ran into strong formations of Messerschmitts and Macchis sweeping the battle area. There were dogfights all over the desert sky. They culminated in a clash late in the evening between a formation of 15 Stukas heavily escorted by fighters, and a South African Hurricane squadron with top cover of R.A.F. fighters. The fight took place over Alamein itself. The Stukas were in three V-formations of five, the first of which was just peeling off to make its dive.

As the Stukas dived, so the 11 Hurricanes dived on to them, while the R.A.F. squadron held off the Messerschmitts. The leading Hurricane pilot, Major G. J. Le Mesurier, hit the first Stuka, which exploded. The other Stukas panicked, put their noses down and tried to get away by skimming the ground. Only two of them may have succeeded. The remaining 13 were shot down by the South Africans. They fell out of the sky in flames, they fell in tattered pieces, they fell whole and exploded on the ground. Some were chased as far as their own airfields at Fuka and shot down there. One Hurricane pilot, Lieutenant R. J. P. Collingwood, D.F.C., himself shot down three Stukas in rapid succession.

It was nearly dusk when the Hurricanes put down on their landing ground, weary but overjoyed. Already the Wellingtons from farther down the road were getting airborne. That night they set fires twinkling all over the desert, particularly around Daba where a direct hit was scored on an ammunition train, which blew up in a sheet of scarlet flame to light the sky. An Italian officer who only six days before had written happily in his diary, "Carrying on towards Alexandria," made another entry on the evening of July 3rd, "The enemy has air superiority. We were bombed eight times during the day."

By July 4th the navigators of the bombers were able to bring back reports on the battlefield

below them such as: "It is an astonishing sight to see that thin black ribbon of tarmac picked out on both sides by an almost continuous line of overturned, smashed or burnt-out vehicles. In places the wrecks lie half across the road itself. . . ." "All the trucks come to a stop as we approach, or the vehicles drive off on to the desert and the crews jump out and run. . . ." "There are so many bomb craters now in the positions immediately in front of our own troops that in places many of them join up and overlap, like the pips of an ace of clubs. In a lot of the craters there are vehicles, some of them armour, knocked out or burned to a shell, or simply driven into the crater in the dust and confusion of the bombing."

That night the enemy made an effort to knock out some of this power at its source. A number of bombers fanned out over the bases in Egypt. The night fighters were waiting for them and shot down five, a high percentage of the total force. Most of the bombers exploded in mid-air under the strength of the night fighters' guns, one with so brilliant a flash that the attacking pilot could see the black crosses on its wings. That same night more than 80 medium bombers of the R.A.F. operated against the enemy in the desert, not one being lost. One of them hit an ammunition dump near Daba; the flames from the explosion reached more than 1,000 feet into the sky. Another struck an ammunition train near Ghazal station, thick smoke climbing higher than the aircraft. Next night they hit three trains, at Daba, Rahman and Ghazal. So it went on, day and night. By July 6th the Germans had retired a little from Alamein and were digging themselves in.

It was a happy timing that on July 3rd the promotion was gazetted in London of Air Marshal to Air Chief Marshal Sir Arthur Tedder, Air Officer Commanding-in-Chief, Middle East. To the men flying and fighting in the desert squadrons that news was a remarkable fillip, a token that those at home watched and appreciated them. The Secretary of State for Air signalled his congratulations to Air Chief Marshal Tedder, and added, "All here have the fullest confidence in you, your staffs and your squadrons. We know that throughout this critical battle you have given and will go on giving the last ounce of effort in support of the Army. You are writing a glorious page in the history of the Royal Air Force."

THE FIGHTING RETREAT



Life stands still as Beaufighters sweep up to attack this M.T. convoy. The trucks are stopped, some driven off the road; doors swing open the men have run for cover. Note the trailers, stacked with fuel drums.

III. THE CRESCENDO AT ALAMEIN

8—Turning On the Power

THE first check at Alamein was to prove the moment at which the brake finally stopped the German wheel, but nobody knew that at the time. To the squadrons in the desert the fight seemed to get sterner. Not until the beginning of August could one say that a lull had arrived.

On the ground around the Alamein positions, attack and counter-attack succeeded each other as the 8th Army rallied from the unavoidable disorganisation of such a retreat and coiled its springs. The Germans felt for an advance in the south and we checked them with an attack in the north on July 9th. Five days later they struck at Alamein from the south-west and failed. By July 20th we had attacked and moved slightly westward, recapturing the Hill of Jesus.

In the air above the battle the light bombers, the fighter-bombers and the fighters swept over in numbers that increased every day. The fighter-bombers in particular reached ever new records for the number of times they attacked. "The area teems with targets," said one of the pilots; "when you go back with another present for the Hun, and your guns reloaded, and see the fires and smoke and craters left by the squadron you passed on the way out, you think, 'Oh hell, if we can only keep this up long enough we shall do in the whole darn lot of them.' "

A good many of the enemy seemed to think so, too. While it was soon to be rumoured that Mussolini, democratically attired in the uniform of a corporal, had arrived in North Africa to lead a triumphal march into Alexandria, and while the Axis radio was busily fixing dates for the occupation of Cairo, few letters or diaries which we captured from troops taking part in the battle itself omitted reference to the hell they were receiving night and day from the R.A.F. "English bombing attack the whole day," noted one German infantryman in his

diary, "result, did not eat or drink very well." Another wrote, on July 8th, "At 1015 hours we were attacked by 20 bombers. One sees no German aircraft!" While Mussolini was said to be reviewing some of his troops in the back areas of Tobruk, others were trickling across at Alamein as deserters, one such complaining wearyly that the war was so long, there were so many casualties, the bombing raids never stopped and he had not slept for eight nights.

By July 15th one squadron alone of the South African Bostons was celebrating its 1,000th bombing sortie. The tank-busters, seeking out targets usually in the southern sector on the edge of the Qattara Depression, led that day a concerted attack on enemy tanks. Bombers, fighter-bombers and tank-busters between them knocked out something approaching 20 tanks, three of which were known to be completely destroyed.

A few days later it was felt that the Luftwaffe was establishing itself a little too comfortably on the landing grounds around Daba. In spite of dust-storms that swirled intermittently on July 19th, the light bombers got several direct hits on aircraft on those landing grounds, the fighter-bombers diving in afterwards. On the way down they found four Ju.52s and a Stuka coming in to land. While still carrying bombs, they shot all five of them down, then bombed and strafed the landing ground, destroying or damaging many more aircraft. Wellingtons in great force raided Daba just after nightfall, leaving a trail of flame 300 yards long and still spreading as the petrol spread.

This so alarmed the Luftwaffe that at dawn next day they had a standing fighter patrol over Daba. It helped them not at all, for that morning the bombers and fighter-bombers switched their attack to the landing grounds at Fuka.

Air power helps to lay the foundations of victory at Alamein. Rommel's last thrust for Egypt is broken, his supply lines are blasted, his air force is shot out of the sky and paralysed on the ground.

While the Messerschmitts vainly circled the one set of landing grounds, the Bostons were getting direct hits on two and very near misses on 10 more aircraft at the other. Again the Kitty-hawks dived through the exploding dust. They did two circuits, one to bomb, one to strafe. "The second time, we came in a long procession with the guns crackling. The rows or groups of aircraft we saw were riddled like colanders. I saw bits and pieces of wrecked aircraft flying up into the dust, and some collapsing on their bellies." A petrol bowser that stood among three aircraft which were being refuelled was blown up. An Italian fighter that ventured too near was shot down.

Next day not a single enemy fighter interfered with our bombing formations. A few Messerschmitts were sighted at dusk, but they sheered off. It was estimated that in those two days something like a hundred enemy aircraft had been damaged, heavily or slightly, on the ground at Daba and Fuka. "Well done, the aerodrome attackers," signalled Air Vice-Marshal Coningham.

By night, towards the end of July, the Wellington bombers also returned to the desert landing ground targets. "These attacks," the crews were told in an operational order, "are causing the enemy losses in men and war material and also loss of sleep. He must be brought to exhaustion point by lack of sleep and by continued attacks on his armour."

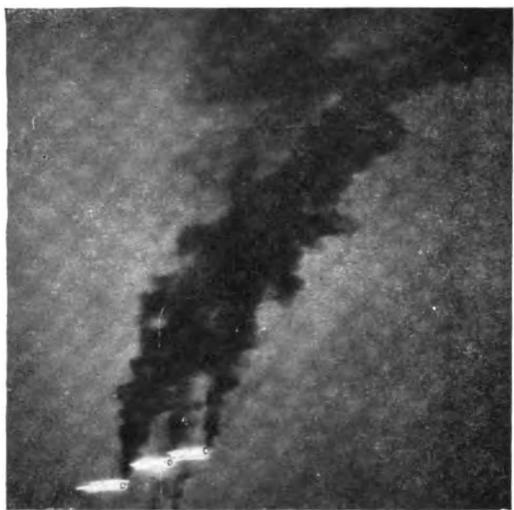
Using the method which had already proved its value, naval Albacores went out with flares to illuminate the desert for scores of Wellingtons each night. Always the crews were able to return with an account of numerous fires starting among the dark shadows of the enemy positions, trucks blowing up, dumps exploding. Sometimes the damage was spectacular, as when one Wellington bombed a dump that was outlined beneath a

flare. There was an enormous red flash which lit up the whole area. The noise of the explosion, even above the beat of the engines, temporarily deafened the Wellington crew. Its blast shattered the perspex in the bomb-aimer's panel and blew the aircraft hatch right out. Then black smoke rose to a height of 5,000 feet, "just like treacle." The bomber had to wait for a quarter of an hour before there was sufficient visibility for a second run.

The battlefield itself, however, had by now become only a secondary target for the night bombers. Tobruk was the place, Tobruk and Benghazi. Air Commodore A. P. Ritchie, A.F.C., the bomber commander, had two types of weapon with which he could strike—the medium bomber, which was the bulk of his force, and the heavy bomber. The retreat to Alamein had deprived him of many landing grounds and cut down his range badly. The medium Wellington bombers were forced back to the Canal zone with refuelling grounds on the Alexandria road; the Liberators of the R.A.F. and of the Halverson Detachment, supplemented now by the arrival of some Halifaxes from Britain, were right back in Palestine. The twin-engine Wellingtons could reach only Tobruk, but the four engines of the Liberators and the Halifaxes would take them still to Benghazi. Air Commodore Ritchie issued an order: "Tobruk and Benghazi harbours are the front and back doors through which the enemy is getting his supplies. The front door is being slowly closed to him. There must be no back door."

During the month of July the front door of Tobruk was attacked in force 33 times, mostly at night but sometimes by day; the back door at Benghazi was attacked by heavy-bomber formations seven times during daylight.

For the defence of Tobruk the Germans



The assault grew by night, as well as by day. Wellingtons attacked the battle-area, starting fires, exploding dumps. In this photograph, the flash has revealed plumes of smoke from three burning M.T.s.

moved in the heaviest A.A. barrage that the desert had seen. Not only were there many guns, but the German gunners had had plenty of practice during their African service. They shot bravely and accurately. On one of the first Tobruk raids a Wellington captained by Pilot Officer J. R. Dudley, D.F.C., was given the task of dropping 16 flares to illuminate the target. This is normally done in four runs, the flares being dropped in groups of four each time. Dudley decided that his illumination would be more efficient if he picked out his placing with great care and dropped the flares singly. He therefore made 16 runs over Tobruk, remaining in the barrage for an hour and twenty minutes. His aircraft was hit during the first run and on most of the succeeding runs, but damaged as it was he brought it back to his airfield.

At dusk on July 17th Liberators and Fortresses appeared over Tobruk while there was still enough light to see the target. There were two ships in the harbour, one a merchant vessel of considerable size, the other a tanker. Both were hit. Soon afterwards the Wellingtons came over on their nightly raid. The tanker was burning fiercely in the middle of the harbour and another big petrol fire had sprung up ashore. The Wellingtons added to the flames that were

already burning, besides starting a fire on the second ship. "More valuable stores of petrol were destroyed at Tobruk last night," said their operational orders a few days later, "but a tanker of 7,600 tons has succeeded in getting into the harbour. This must be sought and destroyed."

It was sought and destroyed by a force of 27 Liberators of the Halverson Detachment on July 27th, in what they reckoned their most successful operation since the attack on the Italian fleet on June 15th. Huge petrol fires swept over the harbour area as they drew off. Nevertheless the bomber commander had still to report of Tobruk that "feverish off-loading activity is maintained daily and a certain amount of supplies is finding its way to Rommel's forces. Continued use of the harbour is proving very expensive to the enemy. It is the intention to make this policy even more expensive."

So it went on. During August, bombers made more than 1,600 sorties against Tobruk in 31 big raids. Twice the Liberators repeated their dusk attack, getting direct hits on large ships each time. These dusk attacks were carried out from a great height, the crews using oxygen and fighting against intense cold. The oxygen mask of a gunner in one Liberator actually froze while the aircraft was approaching the target. He fell unconscious to the floor, the mask was torn from his face and nobody at that height had sufficient strength to move him into reach of it again. While the bombing run was being made the navigator filled his mouth with pure oxygen from an emergency bottle, put his lips to those of the unconscious gunner and blew the oxygen into his lungs in time with the rhythm of his faint breathing. As the bombs fell, the man's life was saved.

The cumulative effect of all these raids was practically to shut the front door of Tobruk. The enemy gradually admitted his defeat and diverted most of his supply convoys to Benghazi, whence they had to travel all those weary hundreds of desert miles by truck to Alamein. Benghazi was out of range of any nightly blitz by medium bombers from Egypt, though it could still be struck from Malta. The heaviest blows were struck, however, by a number of daylight-to-dusk attacks by the four-engine bombers. They were delivered seven times during July, the targets being ships and harbour works. The back door was pushed now and then, but it remained ajar.

THE CRESCENDO AT ALAMEIN



Tobruk was the target at this time ; it was the front door for Rommel's supplies. While the shutter was open for this photograph, taken 10,000 feet above an El Gubi landing ground, lights streaked across the moving film from (1) two small fires just off the area photographed, (2) incendiaries beginning to burn, (3) a parachute flare dropped to illuminate the target. The instantaneous photoflash revealed (4) a stick of four bomb-bursts among (5) dispersed stores and equipment, and (6) smoke plumes rising from the two fires.



To shut the front door, American heavy bombers join the assault on Tobruk. *Left*, a precision attack on the area round the main jetty. *Right*, next day, the jetty is seen to have been destroyed and a merchant vessel

Before he could pass his supplies through the back door, however, the enemy had first to get them there; afterwards he had to carry them right across Cyrenaica and much of Egypt before they could be used at Alamein. All the way they were vulnerable to air attack, though not with such ease now that we had lost the coastal airfields of the desert. Malta, isolated and on thin rations since it was at that time impossible to run convoys from Alexandria to the island, still had some striking power against ships at sea. From Egypt the heavy bombers could reach out to some of the northern harbours.

The most persistent damage was done to the enemy supplies by the Beaufighters with their

long range and their 12 guns. The enemy had a choice of two supply routes from Benghazi to the front. It was too dangerous after a few weeks of nightly bombing for many ships of size to run into Tobruk, so the supplies were split up into small lots and carried forward either in trucks along the coast road or in barges, lighters and small vessels just off shore. The Beaufighters chose the shipping traffic for the first weight of their attack. Day after day they roamed in small formations up and down the coast seeking targets, always at the risk of concentrated attack from the Messerschmitts and Macchis which were so readily available on the coastal airfields.

During the first days in August the Beaufighters



which was alongside it is still burning. The squat, almost square boats in the harbour are Siebel ferries, first seen off the West coast of Greece. The stick-like ships at the opposite shore are F-boats, Italian supply barges.

were sinking barges or setting them on fire one after the other. Some of them exploded when the cannon shells touched off their cargoes of ammunition or petrol. On August 7th they sunk five barges within 12 hours. During the three weeks ended August 9th more than 20 barges and lighters were destroyed. That does not, perhaps, sound a very important thing. But those barges could carry as much cargo as about 1,500 three-ton trucks. They could handle tanks of the largest size. The enemy prized their usefulness so highly that they were given the most elaborate protection. Guns were mounted on them, flakships sailed by their side, squadrons of fighters stood ready on shore at their call. Barge-

strafing, in fact, became just a little too hot even for Beaufighters.

They promptly switched their attacks on to the columns of trucks winding wearily along the coast road. One day they appeared suddenly near Sidi Barrani where troop-transport columns were crowded together. In a few seconds trucks were heeled over and on fire, scores of men were dropping from the crowd that scattered and ran for the desert. Another day they were over the pass at Sollum, a fiendish place to be attacked, with rock wall rising steeply on one side of the road and a near precipice dropping away on the other. Yet again they came across 100 infantry-men marching along the road. About 50 were

killed before they could scatter. On the way home the Beaufighters shot down two Ju.52s.

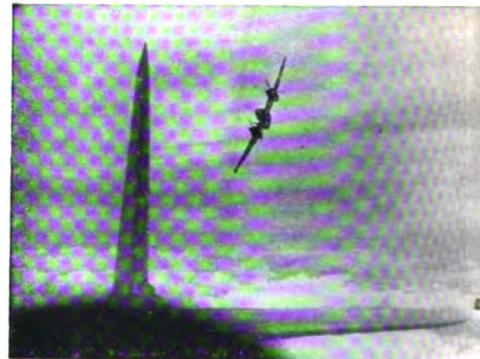
The enemy withdrew some of his protection from the coastal traffic to fly it up and down the road. Back on to the barges went the Beaufighters, the Hudsons and the Bisleys—aircraft developed from the staunch old Blenheim which had been added to the force, and flown by S.A.A.F. crews. On August 15th Beaufighters escorted six of them in an attack line abreast on 16 barges between Sidi Barrani and Matruh. The Bisleys scored five direct hits, and three barges simply disappeared. The Beaufighters shot down into the sea a Macchi 202 from numbers of enemy fighters which attempted to interfere.

Out over the Mediterranean at night the torpedo-carrying Wellingtons sought more ambitious targets. Their job was to sink the supplies in bulk before they reached the African coast at all. They were so badly handicapped by the loss of the coastal airfields of the desert that they had little luck for many weeks. The supply ships simply sailed well out of their range. But towards the end of August Rommel decided to make his bid for the final defeat of the 8th Army and the capture of the Delta. He needed a last-minute rush of supplies and thought it worth while to attempt to run them into Tobruk; the risk was necessary in order to have a supply concentration for the battle.

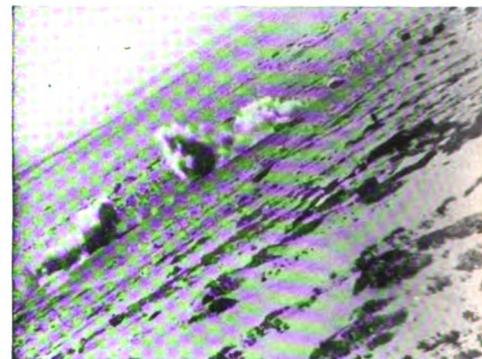
That decision brought the ships within range of the Wellingtons. On August 28th a Maryland on reconnaissance found a number of ships steaming to the west of Crete, strongly escorted by destroyers. Immediately at darkness a striking-force of Wellingtons and Liberators, some carrying bombs and some of the Wellingtons torpedoes, set out to search for them. A bomber scored first. Due north of Derna it hit a tanker which blew up. That blow alone knocked off some of the miles which the German tanks could travel over the desert. The destroyers hastily whipped around the ships, laying smoke screens. A second force of torpedo and bomber Wellingtons took off to attack the one remaining tanker and the other merchant ships. A bomber hit one of these and it exploded with a force that rocked the aircraft. One of the torpedo Wellingtons found the tanker which was carrying high-grade aviation fuel for the Messerschmitts. The pilot, Flight Lieutenant M. Foulis, D.F.C., described the hunt thus:

"We sighted the ships at 0015 hours in the

As the bombers hammered



1. The most persistent damage was done by the Beaufighters, with their 12 guns



4. Enemy supply column swept by cannon—photographed as the pilot comes in to attack



7. The same patrol, in the same afternoon, left these two petrol bowsers burning fiercely.

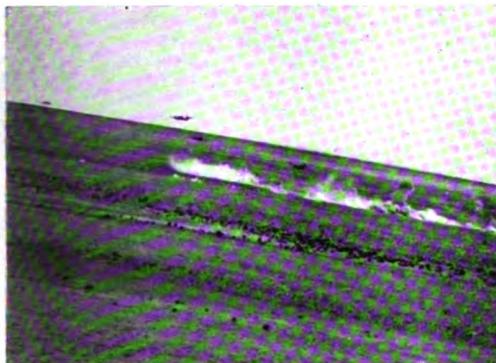
the ports, fighters ranged the land and air routes, burning, destroying.



2. A burst of bullets rips across two lorries, caught on the coast road south of Benghazi.



3. Part of the same convoy at the moment of attack. A man crouches behind the rear lorry.



5. A Beaufighter patrol has forced down a Ju. 52 transport and is now destroying it.



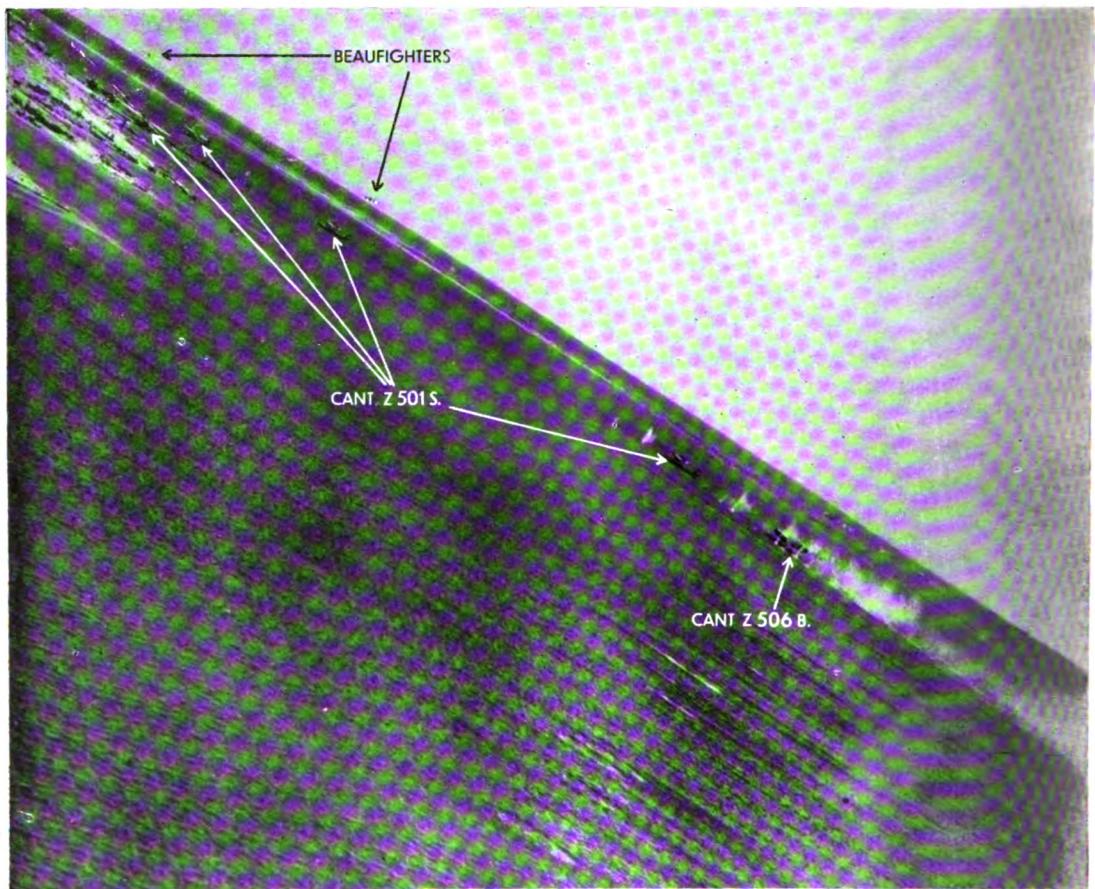
6. Close-up of the Ju. 52. The starboard engine is on fire ; note the man lying by the nose.



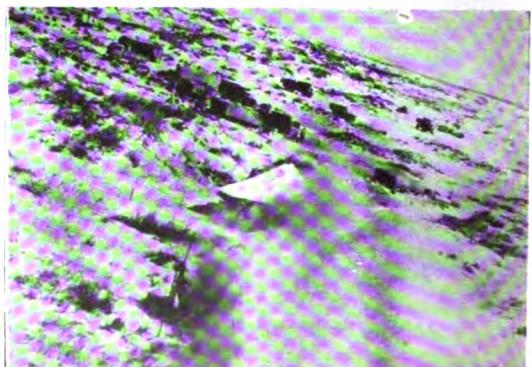
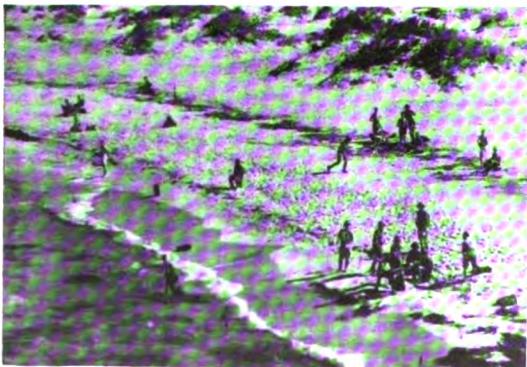
8. Enemy supplies burn briskly after a raid by light bombers. The lorry had reached Sidi Barrani.

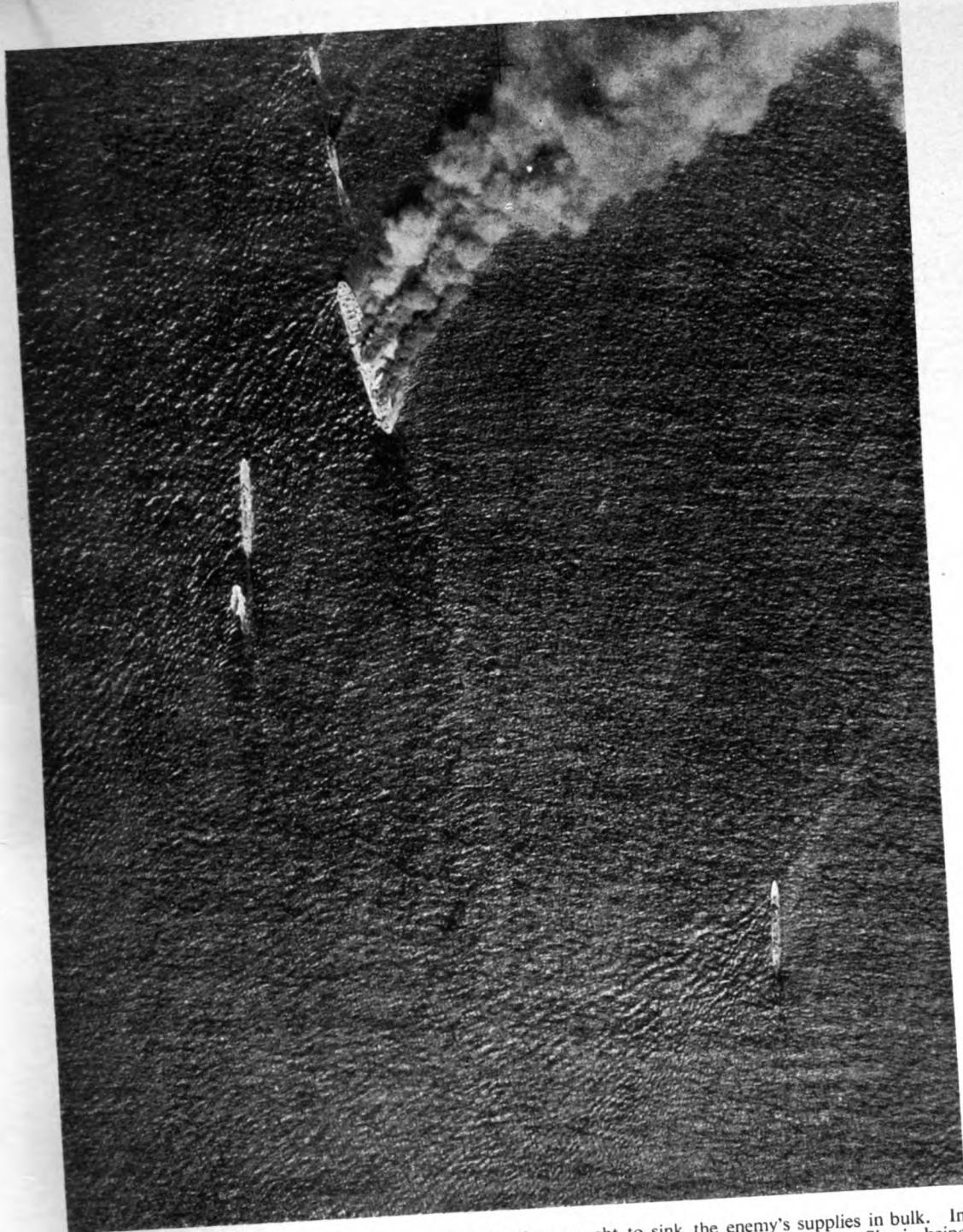


9. This burning petrol bowser, those in 7, the Ju. 52, the train on p. 99 were one afternoon's work.



The Beaufighters also ranged along the coast, attacking mainly the barges bringing supplies from Benghazi. This patrol shot up four seaplanes at Bomba ; it then swooped inland, surprising troops washing their clothes on the beach (the camera has caught the moment of first alarm) ; it attacked a camp near Gazala, where the men have gone to cover and a tent is on fire in the foreground.





Out over the Mediterranean, Wellingtons and Beauforts sought to sink the enemy's supplies in bulk. In this picture a 7,000-ton merchant vessel of the Lerici class has been set on fire by Beauforts. She is being towed back towards Greece, stern foremost, by two tugs, while two destroyers and an Italian E-boat stand by

moonpath. There was no cloud and a bright moon. We could see the ship clearly, a vessel of about 8,000 tons, perhaps a little less. There was one destroyer about two miles ahead of her, another about a mile on her port bow, and a third close in to her starboard quarter. I spent about 20 minutes flying across the moonpath on the west side to work out my line of attack. Eventually I made up my mind on the best approach and we commenced a long run-up on the ship's starboard bow. She was not fully in our moonpath but she was clearly visible. I could see no white wake astern of her, but the track in the sea along which she had travelled could be seen. I dropped my first torpedo at a range of 700 yards and the second at 400 yards. We flew ahead of one destroyer but were not fired upon until after the torpedoes had been released. As soon as the second torpedo had gone, I pulled the aircraft up and we passed over the the centre and the stern of the ship.

"The torpedoes were on their way but had not yet reached her. The destroyer close in and the ship herself both opened fire, the latter at point-blank range. My rear gunner could not fire at the ship because he could not sufficiently depress his guns. I took violent evasive action and we escaped damage. The navigator who was in the astrodome and the rear gunner both reported two bright orange

flashes on the vessel, astern and amidships. I swung the aircraft round and we could all see two great columns of water going up above her masts. It was clear that both torpedoes had hit.

"We ran up and down on the west side watching developments. Very quickly thick grey smoke began to come out of the ship. The destroyers closed in to her, and within five minutes a heavy smoke pall lay over all the ships. We could plainly smell this smoke in the aircraft. It smelt oily and acrid. We sent our first target report: 'Two hits on tanker, stationary, smoking.' After about 10 minutes the smoke cleared and a large oil patch was all that remained of the merchant ship. The destroyers were there but nothing else. We sent a signal: 'Tanker believed sunk, large oil patch seen.'"

Two nights later another convoy of ships was found in roughly the same place, again trying to make Tobruk. These too were attacked, and in spite of smoke screens it was known that one of the ships was hit, for she was later seen on fire.

It is believed that the loss of the first two tankers caused the German commander to postpone the date of his offensive by five days. When some of the second convoy got through he could wait no longer, deciding to risk the trial with what supplies he had.

9—Wall of Artillery, Ceiling of Bombs

SINCE THE BEGINNING of August the desert had been fairly quiet. The two armies faced each other on the line south from Alamein; the two air forces flew as little as possible in order to build up their strength. The desert fighter force was indeed stronger. Not only had it been increased to 21 squadrons but the standard of serviceability within the squadrons had been improved. Moreover there were now three squadrons of Spitfires, sweeping high over the battle area and for the first time causing the Messerschmitt pilots to look apprehensively upwards instead of down. It was said a little maliciously that from that time onwards no

German pilot would ever admit to having been shot down by anything but a Spitfire and no Italian fighter pilot ever condescended to destroy anything else. Rome radio certainly played havoc with the Spitfire squadrons.

Although it was a period of lull, the desert aircraft did not allow themselves to rust. Every day there were fighter and reconnaissance sweeps, and most days the fighter-bombers attacked something or other. They called the process "jerking up the Hun." It consisted of sweeping down on his camps, bombing them first, then strafing them.

But in the main the desert was quiet during

August. Apart from the heat and a plague of flies, the squadrons lived more comfortably than they had ever done. Water was good and plentiful; the recreations of Alexandria were to hand; and, with shops so near, such luxuries as fruit, roast chicken, even mint sauce appeared on trestle tables in the mess tents. Men came back from the city with new books still in their dust covers. The desert airmen gratefully absorbed a few civilised comforts for a change, knowing that the battle would soon begin; with one eye on the south of the line they sang new words to the old jingle, "Coming down the mountain"—"They'll be coming through Qattara when they come, when they come."

It was in fact in the south, though not in the Qattara Depression itself, that on the night of August 30th/31st Rommel launched his delayed attack with the full strength of the Afrika Korps. While the Italians made a few holding attacks in the north, the 15th and 21st Panzers supported by the 90th Light Division pushed through our southern minefields. The armour was through by 9 o'clock in the morning and then, harassed only by light mobile forces on the ground, it came forward quickly as far as the Ragil Depression. The panzers paused there, obviously expecting that our armour would counter-attack. There was no counter-attack. The panzers pushed on to the south-west of Alam el Bueib, where they met the main defences of our guns. By last light they had retired, badly damaged, to the Ragil Depression. That briefly was the ground situation on the first day. It should be remembered that the place-names denote nothing but ridges or tracks, and that the whole battle was fought across a bare, dry, hot desert, unrelieved by any vegetation higher than a clump of camelthorn.

The sudden change at the airfields was striking. The new books were pitched aside, the meals swallowed in haste. Every aircraft of this strengthened force was flying. The full weight of our air power was turned upon the enemy columns.

From the first moment that the panzers moved during the night of August 30th/31st they were bombed. Many of the Wellingtons which attacked them that night flew double sorties; that is, returning after the first attack, they were bombed-up again and refuelled in the darkness for the same crews to take off on a second raid. By dawn there were already 30 fires burning in



Rommel's bid for Egypt was known to be coming soon. Co-operation between the R.A.F. and the Army was now keyed to attack at once any grouping by his armour. A forward observation post watches.

the desert and already the first Baltimore raid, fighter-escorted, was over the Afrika Korps. Before the Baltimores had landed the Bostons were there. Freed from any considerable ground engagement until late afternoon, the Germans could turn all their guns upwards, so that it was through the heaviest barrage of A.A. fire that the bombers had to make their runs.

After the first few raids we met bad luck. A great sandstorm blotted out our airfields, while those of the Luftwaffe were clear. Fortunately some of the fighter squadrons had been moved to other airfields that were free from dust, so that fighter sweeps could be flown over the battle all day long. This was as well, for the Luftwaffe was extended to its limit in support of the attack. There was one formation of 40 Stukas escorted by 50 Me.109s which our fighters intercepted while it was still over its own troops. The Stukas jettisoned their bombs, some on the German columns, and fled in steep dives to the ground. Even so, three of them were shot down.

Throughout the day we lost not a single fighter pilot. In the evening, just as the panzers were retiring towards Ragil from the British guns, the dust on the airfields lifted sufficiently for several more light-bomber raids to be directed at them. Light bombers and fighters of the United States Army Air Forces, which had moved up in small numbers into the desert, took part



The German armour moves. The observation officer has seen two or three hundred enemy vehicles moving on the distant ridge. There is a sudden change at the airfields.

Telephones ring, briefing tents are crowded, air crews bundle into the waiting trucks and race to their machines. Bombers, with fighter escort, make for the signalled target.

The bombs go down upon the ridge, destroying some of the enemy vehicles, dispersing the rest. Grouping for attack must start again.

In the days to come, operations like this took place many times. Months of practice and experience in working together were about to bring their reward.





in these raids. The Germans looking upwards saw not only the roundel of Britain but also the star of America.

Directly darkness fell, the Wellingtons were over the Ragil positions into which the German columns had retired. As one of the light-bomber commanders put it, we gave them two bomb-free periods every 24 hours—half an hour for their breakfast just before dawn, and half an hour for their supper just after dusk. For the remaining 23 hours they were bombed without respite.

Weary from lack of sleep, but committed now to their assault, the German columns came north from Ragil the following morning and fighting went on most of the day. So did the bombing. The squadrons were still hindered by dust storms, but in spite of them they put over seven escorted light-bomber raids by midday, Baltimores and Bostons taking it in turn, with the reinforcement of the American Mitchells, medium bombers. It was evident that Rommel realised his peril by then, faced by a wall of artillery on the ground, under a ceiling of bombs. He called on his own air force to protect him at least from the bombs, and the Luftwaffe came in force. Those first seven raids were costly to our squadrons. None of the enemy fighters succeeded in getting through our fighter screens to shoot down a bomber, but we lost three bombers to A.A. fire, while in one dogfight around a bombing formation six fighters were shot down for only one of theirs.

The day, however, was not ended. In the afternoon Kittyhawk pilots saw approaching them what one described as "a thick black wall coming through the air over the desert." It was a formation of 40 Stukas and more than 50 Me.109s. The Kittyhawks dived on them. The fight was over in two minutes, though "with never a dull second." The whole formation was routed before it could drop its bombs—four Stukas and two Messerschmitts were shot down; three more were probably destroyed and several damaged. Two fell to the guns of Squadron Leader Billy Drake, D.S.O., D.F.C., one of the top-scoring pilots of the desert. We had no losses. In the evening some Hurricanes met 15 Ju.88s, forced them to jettison their bombs and destroyed three of them, again for no loss. In other scattered engagements during the day, four more Messerschmitts were shot down. The balance lay with us in air combat, to say nothing of the bomb damage that had been done.

Half an hour for supper and the Wellingtons took over, many of them again flying double sorties. One of the many fires they started was still blazing and exploding when the last aircraft left just before dawn. Half an hour for breakfast and it was the turn of the Bostons, Baltimores and Mitchells. On that day, September 2nd, the light-bombers created a record of flying 20 per cent. more sorties than they had ever flown before.

The Luftwaffe was still working hard and several big Stuka formations flew against our troops. There was this difference: the Stukas no longer dived. They no longer dared to risk that one manœuvre from which most of their terror qualities sprang, but which exposed them to particular vulnerability to fighters. Instead, they released their bombs flying straight and level at a height of several thousand feet. Since a Stuka has no method of aiming a bomb except to aim the aircraft in a dive at the target, straight and level bombing was of the wildest, doing scant damage. Yet even these half-hearted bombing attacks were not cheap. By nightfall the enemy had lost six Stukas, eight Messerschmitts and one Macchi, with as many more probably destroyed or damaged. Our losses were 10 fighters, but five of the pilots were already known to be safe.

Then all night long the Wellingtons bombed, again causing many fires. Since they were not using incendiary bombs, the Wellington pilots knew that every fire they saw below them was some enemy truck or dump which had been knocked out. Of two of the explosions there could be no doubt in any circumstances. One threw debris to a height of 5,000 feet, another rocked an aircraft 1,000 feet higher still.

Such night bombing was achieved only because of the magnificent work of the naval airmen, in their slow Albacores, who went ahead and dropped flares for the Wellingtons. Air Chief Marshal Tedder signalled to the C.-in-C., Mediterranean, asking that the naval squadrons should be congratulated. "There is no doubt," he wrote, "that these continuous night attacks were one of the decisive factors in crushing the enemy attack."

September 3rd compensated for its predecessors by being a day free from dust storms. The light bombers therefore outstripped their own record of the day before, and for the first time flew more than 200 sorties in a single day, with no losses, although their escorts had a hard

time fighting off attacks from Messerschmitts and Macchis.

Something should be said here, as the pilots said at the time, of the contribution which the ground crews on the airfields made to this day of record light bombing. In the language of the Air Force, every man, from the Group Captain controlling operations to the A.C.2 cook, "had his finger well out." Let the cooks this time speak for everybody. The cooks on a desert airfield work with the most meagre equipment, often with the most monotonous food, in fly-plagued conditions of great heat.

On this day of record bombing the cooks of one squadron determined that not a single air crew should come back to the mess to a cold and scrappy meal. Not one did. At half-past five in the afternoon 72 weary airmen entered that mess after a series of raids and were at once served with a well-cooked hot lunch. Not a feast of war, perhaps, but it took some doing on a few old tin cans, a battered petrol burner choked with dust, and an oven built of sand cemented with water. The cooks saw nothing of the fight, but they had contributed to it.

During those early days of September a Wellington was forced to make a crash-landing well to the south of Tobruk. Its crew consisted of a pilot officer, a flight sergeant, and four sergeants, none of whom was injured in the landing. Since they appeared to have crashed near an enemy post, they spent the rest of the night zig-zagging far into the desert between themselves and home. It was to take them 29 days and all except one of them were to arrive home safely.

The first six days were spent in getting as far as the frontier wire. Here and there they had run across parties of Arabs watering their camels, and once the front gunner was lowered down an old well in the desert—a deep hole chipped with infinite patience by the wandering Arabs—to haul up water from the bottom. They found the remains of several old British camps, even found a can of bully-beef at one of them.

They had been over the border for only a couple of days when they managed to catch some camels, apparently unattended, upon which they loaded their kit. Soon afterwards the Arab camel driver came up and they had to surrender the camels. The Arab and his villagers sold them food and water but would not dare to act as guides for the journey east. There were too



The Luftwaffe put all its weight into the bid for Egypt, Rommel flung in his Stukas until our pilots saw "a thick black wall coming through the air."



The Stukas were forced to jettison their bombs in raid after raid. They scattered and fled—and one by one they flamed down and bit the dust of the desert.

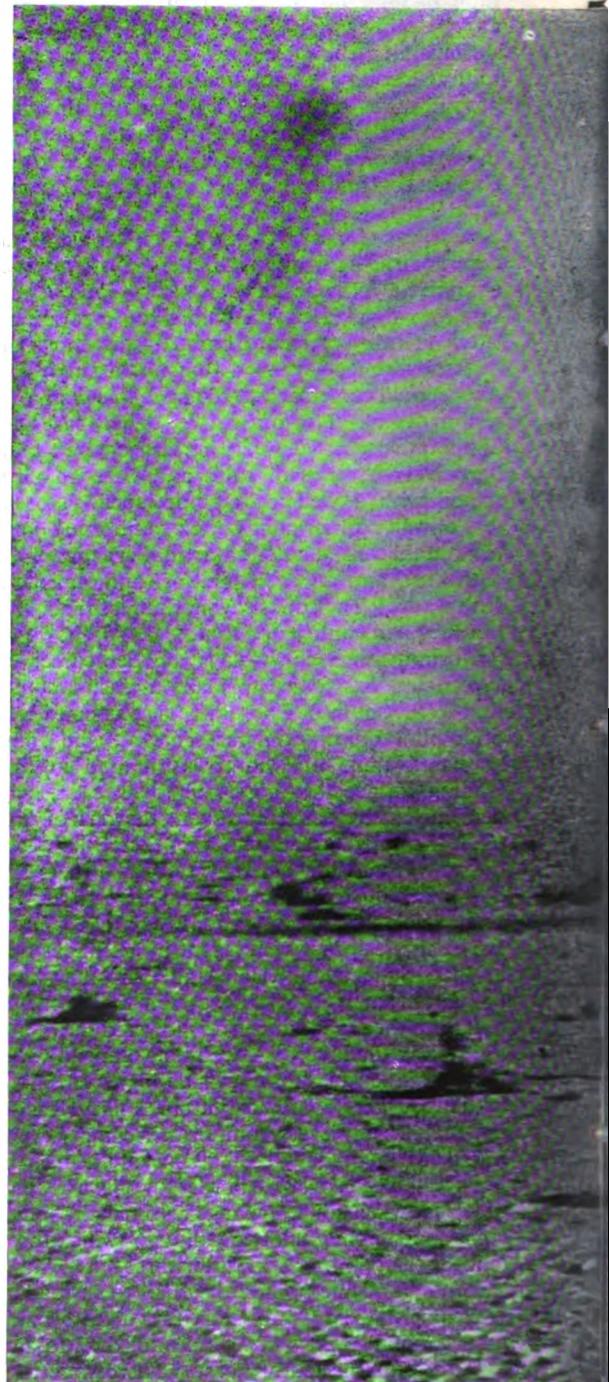


many of the enemy about. By the fourteenth day their luck was beginning to fail. Several wells to which they had navigated themselves had proved dry. The rear gunner was suffering from sore and painful feet, which were beginning to become infected, and for his sake the whole party turned farther to the north, nearer the coast road and the camps.

The pilot officer in command of the party then decided on a desperate gamble—to try to capture a lorry from the enemy convoys that were passing back and forth continually in the north. He spent the fifteenth day lying hidden on a small sandhill, watching the traffic going by on the coast road, while the rest of the party waited at a well. That night, directly the moon was up, they moved forward, following the tracks of motor trucks in the sand. They saw two lorries standing about 50 yards from each other and decided to make an attempt for one of them. Two men stayed behind with the kit, the other four crept up towards the nearest lorry. The rear gunner was given the leading part to play since he had considerable experience of guerrilla warfare in Spain and in Finland.

They pounced on the truck, knocking the driver over the head with a revolver butt. Unfortunately both lorries were full of sleeping troops, who at once jumped to their guns and started firing. The second pilot, who was hatless, had got right inside the lorry; for a while the enemy troops mistook him for one of themselves. It was clear that against such odds the truck could not be captured, so the pilot officer drew his party away, firing as they went. The only man who did not succeed in escaping was the rear gunner. The other five dispersed in the darkness and had come together again by dawn. They struck out again for the south-east to get away from inhabited places.

The remainder of their journey was a careful trek from well to well across the desert. They had with them the maps from their aircraft, by which the navigator steered them cleverly. Now and then they met wandering Arabs or small tent villages at which they purchased a little food and water. Once they had to break suddenly to the south to avoid an enemy airfield. They finished the journey through the salt marshes and rough going of the Qattara Depression, heading to the east for Lake Maghra. On the 29th day, still reasonably fresh and in good humour, this party of five men contacted a British tank unit



THE CRESCENDO AT ALAMEIN



It was the end of the Stuka as a fighting weapon. For a time they abandoned the manœuvre for which they were designed ; they no longer dived. But from several thousand feet they had no method of aiming—and the R.A.F. still shot them out of the sky.



and was brought back to our own lines. With courage and determination, and by keeping their heads, they had beaten the desert and penetrated 350 miles of enemy territory. It is never too late to come back.

While the Wellingtons were again over the battlefield from dusk till dawn, during the night of September 3rd/4th another striking force was at work over the Mediterranean. Desperate attempts were being made by the enemy to run in some supplies that might still turn the issue. So one force of Wellingtons returned to bomb Tobruk, while another of torpedo Wellingtons and Liberators sought out a convoy which had been steaming southwards from Crete. They found it about 40 miles off Tobruk. A Wellington made the first attack, launching two torpedoes

at a merchant ship of some 5,000 tons. The navigator and the rear gunner both saw a large explosion; and when the pilot circled to investigate, he saw to his astonishment that the ship had been split into two halves, both of which were blazing furiously.

There were two other merchant ships in the convoy. One was sunk by one of our own naval vessels which was guided to her by a Wellington. The other was sunk by torpedoes from a third Wellington. When next morning a striking-force of Hudsons was sent to finish off the convoy, they found only two ships, ablaze and sinking, and three hospital ships standing by. So they used their bombs on one of the destroyers in a low-level attack and probably sank her.

The destruction of that convoy, coupled with



the assault on the field of battle, finished the thing. Next day, September 4th, the light bombers were attacking an enemy force that was retreating to the west behind a screen of tanks and guns. The comparatively small piece of desert over which the battle had been fought was littered with tangled and burnt vehicles. The Axis radio declared stoutly that the whole thing had been nothing but a minor reconnaissance in force. But our Army discovered on the battlefield some 40 German and some dozen Italian tanks which were so badly battered that the enemy had left them, although he dragged away all that he could.

By September 5th the battle was over. Except for a bridgehead across our southern minefields the Afrika Korps had thrown in all its strength

only to be driven back, badly hit, to the positions it held on August 29th. The Luftwaffe, which had often put up formations of 100 aircraft at the same time to support the German troops had lost 55 for certain, probably many more. This was Rommel's throw to beat the 8th Army and capture Egypt. It failed fundamentally because of the interruption by the air force or supply lines before the battle began, and because of the effect on morale of incessant bombing during its progress.

The damage done to the Afrika Korps on the battlefield itself can fairly be shared between the artillery of the 8th Army and the bombers. Each appreciated in a friendly rivalry how much the other had done. It should be remembered that this is an account of only the air side of the battle. The way in which the two arms both struck at the enemy is illustrated by a story which the gunners told with rueful good humour. A German column presented some of their batteries with a perfect target, the gunners' dream. Ranges were adjusted, sights trained. On the point of firing, the battery commander, seeing a bomber formation approaching, paused to allow it to bomb. When the smoke and the dust cleared the ideal target was a tangle of torn and burning trucks, only debris remained of the gunners' dream.

Blazing, twisted wreckage and the graves of German airmen marked the defeat of the Luftwaffe before Alamein; 55 aircraft were destroyed for certain in six days. For German air power in Africa it was the beginning of the end.



10—"They flew everywhere, stinging like hornets"

THE GERMANS HAD stirred the desert, and wished now only for another lull in which they might strive to rebuild their forces. But the Allied air force had finished with lulls. The hand that controlled the machine was pressing all the buttons, every cogwheel was gathering speed. The airmen knew that the next attack would come from their side, would come soon, and that their first task would be to weaken the enemy at every point, their second to open the battle.

The night bombers returned relentlessly to the target of Tobruk. The greatest attack was on the night of September 13th/14th, when a combined operation was carried out against the town. While naval and military units were making a landing, the bombers, in greater strength than ever before, plastered the town with bombs up to a weight of 4,000 lb. each throughout the night. Fires that sprang up around the docks and the fuel storage tanks spread into conflagrations. The pilot of a heavy bomber returning from a simultaneous raid on Benghazi reported that when he passed Tobruk there was one fuel tank "glowing and pulsating like a big red orchid." At the start of the raid and for the first hour, the whole Tobruk A.A. barrage was firing furiously. When the last bomber turned east there were only three guns still firing, wildly and intermittently.

On September 16th came the first of three raids on Benghazi which, even in the long history of raids on that city, were outstanding. During the morning a large number of Liberator bombers of the U.S.A.A.F. and R.A.F. took off from near Cairo and flew in close formation to bomb Benghazi. They had to dispense with fighter protection for 1,200 miles, for the four-engine bombers were the only aircraft with anything like sufficient range to reach the target.

At midday, still flying in perfect formation, the Liberators sailed out of the sun across Benghazi harbour where a number of sizable ships were off-loading on to the converted wrecks, George, Harry and Johnny. The Liberators pattern-bombed. All, that is, released their bombs at the

same moment; many bombs, of heavy weight. The watching air-crews saw sharp white flashes on the decks of several of the ships. Clouds of white steam curled up in the sunshine, thickening rapidly into oily rolls of black smoke. Behind the tails of the returning bombers there were three such columns of smoke, one of which suddenly exploded with great force, flinging debris high above the harbour. All the Liberators returned safely.

The raid was repeated near dusk on September 22nd, and again in darkness six hours later. After the dusk raid the rear gunners, gazing into the sunset over the sea, saw a more vivid flash of orange against the sky as a ship blew up violently. The night bombers guided themselves to the target from a distance of 80 miles by the glow of a burning merchant vessel.

Even the official report on the photographs taken during these three raids describes the damage as "spectacular." During the first a supply ship of 6,500 tons which was off-loading on to George was hit and set on fire. She had to be towed towards the outer mole where she burnt herself out. The second raid—that carried out against the sunset—completely disposed of those obstinate targets Harry and Johnny, wrecks, it will be remembered, which had been concreted in and had become the main unloading jetties of battered Benghazi harbour. When the bombers arrived, a merchant ship lay alongside Harry. She must have been unloading either petrol or ammunition, for when she was hit she blew up and disintegrated into tangled wreckage with her battered stern flung right up on top of the mole.

The force of that explosion broke Harry, concrete and all, from the Cathedral mole and sank her stern. It overturned Johnny on to her port side, leaving only the starboard rail awash; it sank two other smaller merchant ships; it sank a smaller concreted wreck named Ink; it burned out yet another merchant ship which lay on the far side of the Cathedral mole; and it picked up a large iron barge and poised it several feet above the water on top of another wreck. The third

THE CRESCENDO AT ALAMEIN

raid, at night, completed the destruction of all this valuable shipping and off-loading space. It is probably an under-estimate to say that those three raids, besides destroying so much valuable material and shipping, halved the value of Benghazi as the back door to Cyrenaica for the supplies the enemy needed so urgently after the disastrous failure of his September attack.

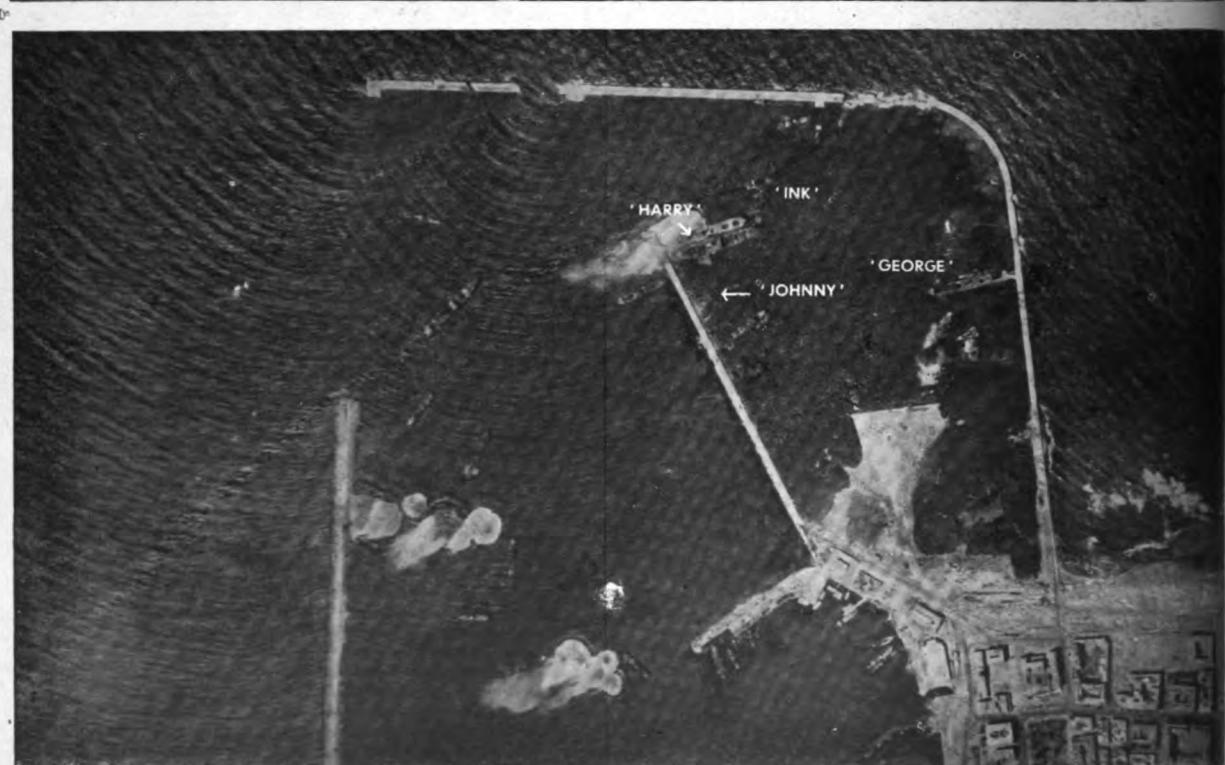
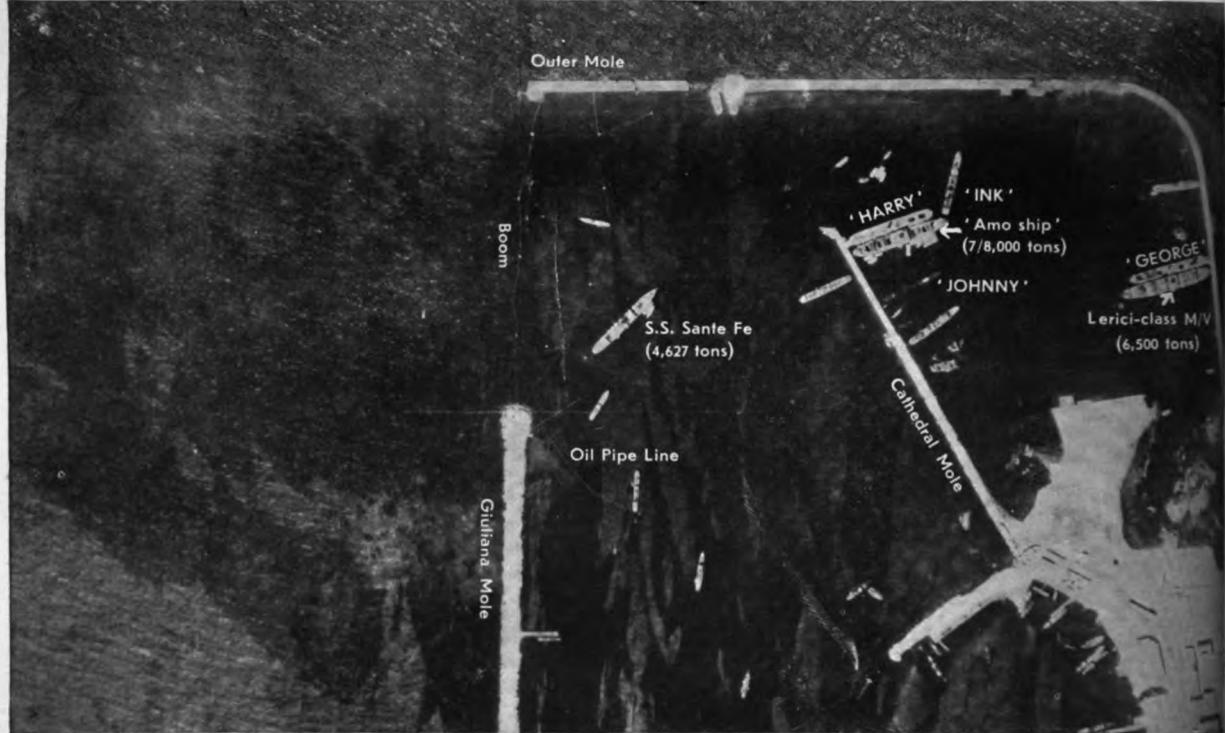
The bombing of ports was only part of the air power that was now gradually exerted. Over the Mediterranean the night sky was lit more and more frequently with the flames of burning tankers and supply ships. The air force over the sea was turning on the power. Every day the Marylands searched for enemy ships, every night when they had been sighted the Wellingtons carried their torpedoes against them, while at

dawn the Hudsons took bombs to finish them off.

Not all the ships that ran to Tobruk or Benghazi were hit. Some got through. Of those, some were knocked out in the harbours, but even so part of their cargo was unloaded and sent on the journey to the front. And there the Beaufighters and the Bisleys struck at it, day after day, whether it travelled by coastal barge, by truck or by train. The Germans had by that time put the desert railway into use again, bringing over from Europe some diesel engines to haul the captured trucks. The trains had no more luck than the barges and the lorries. One was discovered by a reconnaissance aircraft to be heading east with a haul of some 26 trucks, some of them flat and carrying heavy artillery, the others covered and doubtless containing

The mail run to Benghazi was now possible only to the heavy four-engined bombers based near Cairo. It did not stop. Halifaxes bombed by night, U.S. Liberators by day. Ground-crews prepare a Halifax as the sun goes down.





The back door from the sea, Benghazi, was the target for three outstanding raids on September 16th and 22nd. Above: Benghazi harbour on Sept. 14th. Two merchant vessels are off-loading on to those converted wrecks, old friends of the mail run, George and Harry. Below, the midday raid (Sept. 16th) begins. A direct hit is seen on the Lerici-class vessel which has moved away from George: a bomb has burst near Harry and the ship alongside, and a stick is exploding round the pipe-line from the Giuliana Mole. In the third photograph, opposite, taken on September 29th, the vessel which was berthed near George has been towed to the Outer Mole and is burnt out; an M.A.S. (Italian M.T.B.) on her deck is damaged. The new vessel berthed at George

Lerici-class M/V
from George, burnt out

Damaged M.A.S. on deck

'HARRY'
broken in two

'INK'
submerged

'Amo ship'
blown up

M/V 1/2,000 tons
burnt out

'JOHNNY'
turned on side

'GEORGE'



shows damage. The ship alongside Harry, thought to have been carrying ammunition or petrol, has exploded violently; only the stern, pitched on to the Cathedral Mole, and tangled wreckage remain. Harry has split in two and the stern half is sunk. The wrecked destroyer Johnnie has turned on her port side; only the starboard rail remains above water. Ink has settled and is half submerged. A vessel of 1/2,000 tons, seen on September 22nd berthed across the Mole from Harry, has been moved to the bend of the Outer Mole and is burnt out. Three merchant vessels, a total of 12/13,000 tons, are destroyed. The destruction of Harry will reduce the unloading capacity by one-third and damage to the oiling jetty and pipe-line will seriously hamper refuelling.



Written off. When the Eighth Army entered Benghazi, they found the harbour strewn with wreckage from the great bombing raids. *Above*, the stern of the ammunition ship hurled on to the Cathedral Mole, behind it the broken remains of Harry. In the foreground is Johnny, awash. *Below*, spectacular damage east of Johnny. The bow plates of the vessel have been curled right back over the shattered superstructure amidships.



ammunition. Two Bisley light bombers escorted by four Beaufighters made out to sea, then turned south again over the coast just at the spot where it had been estimated the train would be. They found it near Mischifa, rumbling across a barren stretch of desert south-east of Sidi Barrani.

Two of the Beaufighters flew in at low level with their cannon firing. They made many hits on the front part of the train so that, as they drew off, there were already small flames licking round the engine tender. The bombs from the Bisleys, followed by more cannonfire from the other two Beaufighters, fanned this fire into a large blaze. By that time the first pair of Beaufighters was round again, strafing twice up and down the whole length of the train. Suddenly a shell touched off the ammunition in the last four wagons. The Beaufighters had to swerve sharply to avoid oil drums, track wheels, pieces of metal rail that were flung to a height of several hundred feet. There was no need to attack that train any more. Flames were running along its whole length, wagons were exploding, a column of smoke was rising that could still be seen when the Beaufighters had completed 40 miles of the homeward journey.

Four more trains were attacked and destroyed in that way during the next few days. The freight which was thus lost was roughly equivalent to the cargo of a merchant ship of some 4,000 tons. That was only a part of the work done by the Beaufighter squadrons. They flew everywhere along the supply routes, stinging like hornets. They left behind them each day a trail of smoking and overturned lorries, a heap of shell-torn bodies, a running pool of burning petrol, a schooner down by the bows with a drift of smoke from her stern, the wreck of a couple of transport aircraft, a line of riddled seaplanes at their moorings at Bomba. Each time they flew, some further necessity of battle was denied to the enemy.

In the battlefield itself the air fighting had by no means drifted back into a lull after the defeat of the German advance in the south. It was not at such intensity, but the Luftwaffe still had a strong force of Stukas at the Fuka landing grounds and of Messerschmitts at Daba. They still directed large formations of Stukas at our troops, preferring the moment just before dusk so that they could approach out of the sun and return into darkness. Some of these raids were intercepted by our fighters, some not. It is the

most intricate problem so to direct a fighter sweep over many miles of desert that it can intercept a formation of aircraft at the right time and height.

It worked well, though, on October 1st, when 18 Stukas escorted by 20 Me.109s swung out of the setting sun into the sights of a dozen Kittyhawks. The pilot leading top cover glanced downwards and saw a remarkable sight. Six Kittyhawks were flying in perfect echelon, each firing its guns. Ahead of them the wobbling Stuka formation was yielding every moment a new gap, as one after the other the aircraft dropped away in flames. Flight Lieutenant M. C. H. Barber, D.F.C., a Rhodesian pilot who happened never before to have seen a Stuka in flight, marked the occasion by himself shooting down three of them. As the first dropped from in front of his guns, he could see six Stukas burning in the air at the same time, including his own victim. Four of them were in flames and counted as certainly destroyed; the other two were as yet only smoking and were put down as probables. In all, six Stukas were certainly destroyed and as many again limped back into the sunset, sadly crippled, even if they got home at all. There was not so much as a bullet hole in any of the Kittyhawks.

Light bombers and fighter-bombers had not been particularly active at this time, but the day of October 9th was especially set aside for them. It was known as the day of the "weather blitz." Autumnal thunderstorms had broken out with severity in many places, but these storms in the desert are remarkably local. One area can be flooded within a few hours, another area only 10 miles away can remain a parched expanse of sand and dust. On October 8th the storms were kind to the Allies. Sufficient rain fell on our own airfields only to lay the dust, but when the films from the reconnaissance cameras were developed it was seen that parts of the main enemy fighter airfields at Daba were waterlogged. A good many of their aircraft would certainly be unable to get off the ground.

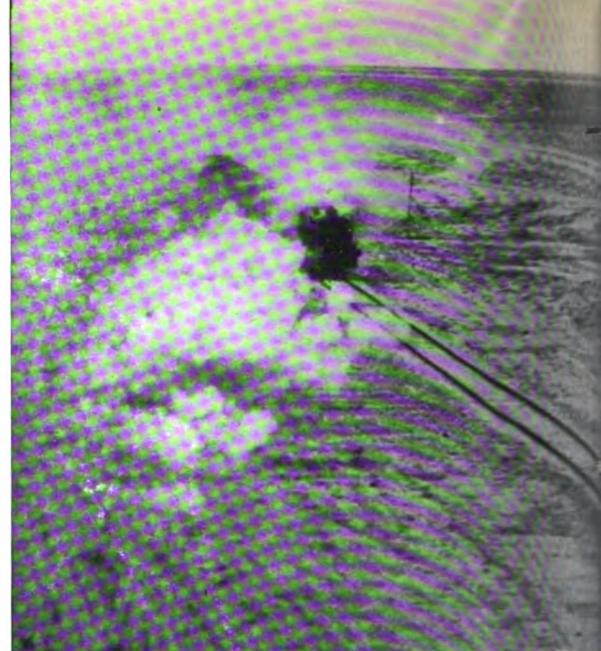
Just before dawn on October 9th the desert airfields were vibrating with the noise of aircraft engines. At first light the biggest day striking-force which had ever flown in the desert was bearing down on Daba. In the centre were the light bombers, several squadrons of them. Pressed close around them were the fighter-bombers. Weaving and turning all over the

surrounding sky were the fighters, Spitfires on top. All told, more than 150 aircraft flew out of the rising sun over Daba airfields. The bombs were released in a pattern, all at the same time. One pilot, glancing up, described the sky as flecked with seemingly innumerable yellow spots—the bombs on their way down. This first big attack was in fact an affair on three levels. In the middle was the bomber force, fanning out to bomb, closing in to move steadily away in a broad circle. Below were the fighter-bombers and cannon fighters sweeping through the dust at little more than the height of tent poles, shooting everything that came into their sights.

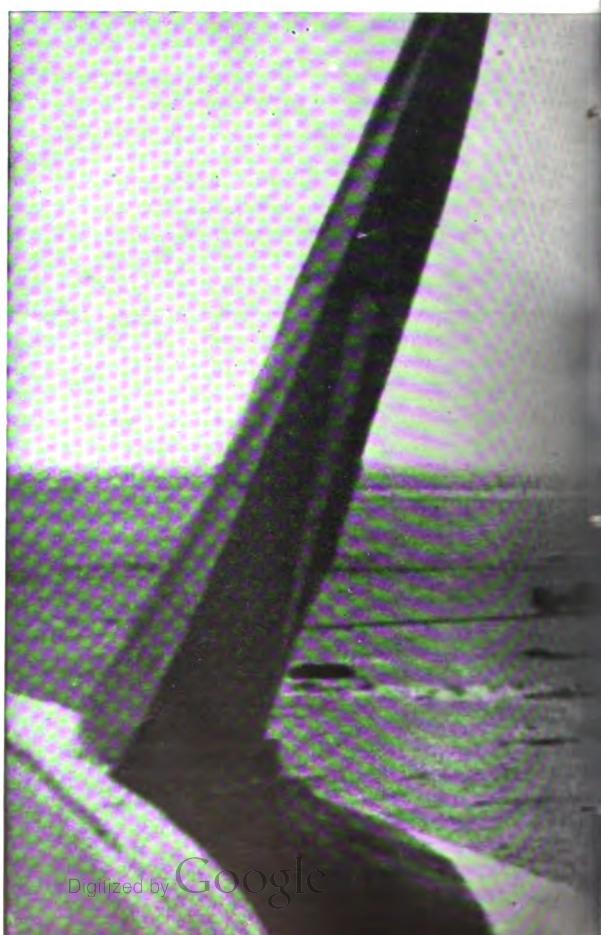
"It started as we came in over the coast," said a squadron commander describing it, "where a group of 10 men, probably the crew of a coastal battery, were staring at us with open mouths. I was only 150 yards away when I opened fire. I saw my ammunition strike their bodies and they must all have been killed. Over the landing ground itself there were dozens of our fighters all close to the deck dodging among the tents and trucks, their guns firing streaks in every direction. Several of us came across aircraft parked in dispersals and shot them up thoroughly. The confusion among the Jerry troops must have been awful. They were rushing out of tents and dashing over to slit trenches, which quite a lot of them never reached."

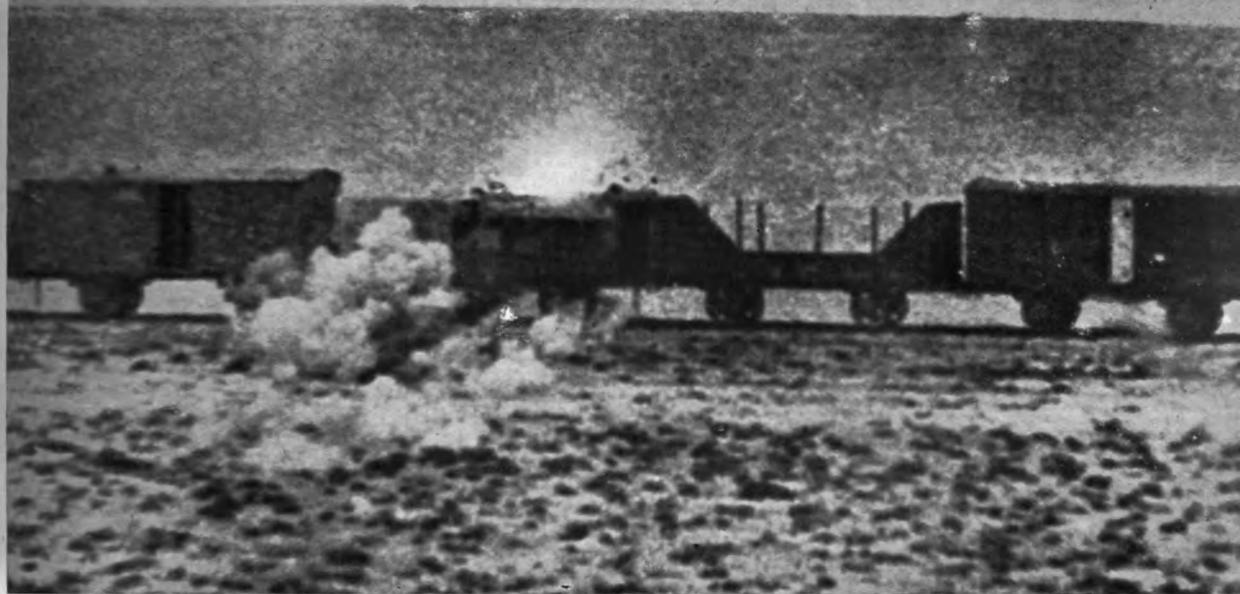
High above all this was the top level of the battle, in which other fighter squadrons were holding off formations of enemy fighters which had managed to get into the air from other landing grounds. In this engagement five Messerschmitts were shot down for the loss of two of our fighters. In this engagement, too, the United States Army Air Forces scored their first fighter victory in the desert. Lieutenant W. J. Mount, in a Warhawk, a development of the Kittyhawk, chased a Messerschmitt out to sea and shot off its tail.

For the rest of the day, raids on a smaller scale were directed against the Daba landing grounds. The evening was rounded off with another raid almost as big as that first one in the morning. The sum of the day's effort was the destruction of at least 50 enemy aircraft, probably a much larger number. Ten Messerschmitts were shot down in air combat and more than that number crippled. Twenty enemy fighters and bombers were knocked out by the bombs that fell on the landing grounds. Fourteen were hit by the low-flying fighters, who



The attacks on the trains. Day after day the Beaufighter swept the land routes—cannon shells fire a train near Matru





Ammunition wagons explode as Beaufighters rake a train of 26 trucks near Mischieta. *Above*, close-up of the broadside attack : the A.A. truck is on fire. *Below*, the explosions begin, flames lick along the whole length.







Journey's end. A German supply train lies blasted by the R.A.F. in a siding at Mersa Matruh. In the space of a few days, Rommel lost 4,000 tons of supplies through these attacks.

also claimed 30 trucks, two A.A. gunposts and an ammunition dump. It cost us 12 fighter aircraft, most of them lost in the hazardous task of strafing.

The "weather blitz" convinced the enemy that the 8th Army was about to launch a full-scale attack, for which Axis propagandists at once prepared their public. Rome radio, in the intervals of announcing the stupendous number of British aircraft that had been destroyed, hinted darkly at "considerable tank movements in the enemy lines."⁴ Doubtless the enemy troops were tensed next morning to receive an attack. But the blitz on Daba had been only a freak of the weather and no land attack followed. The day was not quite yet.

Meanwhile, a fierce air battle had sprung up elsewhere, at Malta, 60 miles from Sicily, 900 miles from Alamein. Since the evening of May 10th, when the newly arrived Spitfires had driven back the bomber formations with such striking losses, the island had been comparatively free from raids on the knock-out scale.

The Germans, still under-estimating the endurance of the defenders, were counting on blockade to reduce the fortress. It is said that they contemplated a full-scale invasion of Malta during the summer, but, once Tobruk had fallen, can-

celled it in favour of a drive on Egypt, judging that the island would automatically fall to them in course of time. Whatever the truth of that story, by October the siege conditions of Malta were pressing.

The Germans chose that time to attempt another big bombing attack on the island. It began on October 11th and continued at intensity for a week. Air Vice-Marshal Sir Keith Park, K.B.E., C.B., M.C., D.F.C., who then held the air command at Malta, felt he had sufficient power on his airfields to adopt a new policy, not so much of defence as of attack. The bombers which came from Sicily were intercepted by Spitfires, not over Malta itself, but over the sea long before they arrived at its coast.

In that week 113 enemy aircraft were definitely destroyed and 70 more so badly crippled that it was doubtful if they could manage even the few sea miles back to Sicily. The numbers which received more or less severe damage ran past count into three figures. Few of the enemy bombers had succeeded in penetrating over Malta's coast, and the damage done by them amounted to little. More important than all, the airfields of the island had been secured to us. Within a few weeks they were to play a vital part in what was one of the crucial battles of the war.

II—Two Strong Arms Strike

IT IS DIFFICULT to fix the date when a modern battle begins. The "weather blitz" on Daba airfield on October 9th, the defence of Malta during the second and third weeks of that month, the obliteration of a railway train on October 12th, the air torpedo that split a merchant vessel in half off Tobruk on the night of October 1st/2nd—each of these was an integral part of the Battle of Alamein and had a measurable effect on its result.

The opening of the battle proper, however, is best fixed on the morning of October 19th, 1942, when a small force of Kittybombers raided Daba landing grounds, knocked out a few aircraft and started a large fire. The great assault by the 8th Army came on the night of October 23rd/24th. In 12 days more, by November 4th, the victory

that was to change the features of the war had been won. Soon the church bells of the villages of England were to peal in celebration for the first time since 1940, while on the same day a corporal of the R.A.F. rang the bell of a church standing comparatively unharmed in the midst of desolation and sent an answering peal over the ruins of Tobruk.

The battle position at Alamein was not complicated. The two opposing forces faced each other on a front of only some 30 miles of desert, running south from the sea at Alamein to the eastern tip of the Qattara Depression, impassable by fighting vehicles. This position was heavily mined and strongpointed on either side, though in the far south the enemy was across some of our minefields.

Close behind the armies were the airfields of the air striking-forces, ours grouped around the Alexandria-Cairo road, the enemy's at Daba and Fuka. For a fighter force we had Spitfires, Kittyhawks, Tomahawks, Hurricanes and Warhawks: he had Messerschmitts, some of them 109Gs of the latest type, and Italian Macchi 202s. Our light and medium day-bomber force was composed of Bostons, Baltimores and Mitchells, his of Stukas and Ju.88s. In night bombing we had a marked advantage with a strong force of twin-engine Wellingtons backed by four-engine Liberators, Halifaxes and Fortresses; Ju.88s and Heinkel 111s were the strength of his night-bombing force. Over the Mediterranean Sea we had more and better aircraft for dropping bomb or torpedo by night or by day, together with long-range Beaufighters of great worth; the enemy on the other hand had a positional advantage, holding practically all the airfields of the Libyan and Egyptian coastline, of Italy, Greece and Crete.

It was clear that any attempt to remove the enemy forces from the Alamein positions would have to be made in a frontal assault. There was no room for those wide sweeping movements beloved of desert commanders. It was planned therefore that air power should strike the first blow, to knock out during a period of five days and four nights as many aircraft as possible on their landing grounds. When this had been accomplished, the artillery was to concentrate a barrage of great strength on the enemy batteries and front lines while the infantry and the sappers advanced to clear gaps in the enemy minefields. Through these gaps our armour would be passed into wider space of manœuvre beyond. Meanwhile, the night bombers, aided by naval Albacores, were to attack the enemy behind the lines as he concentrated to meet the land attack. Directly our land forces joined battle, the full weight of air power would be directed against the enemy army both by night and by day. Throughout the entire battle, air power would continue to cut off the enemy's supplies.

From this brief summary it will be seen how harmoniously the air and land forces of the Allies had learned to co-operate in the Middle East. They were two strengths with one aim, the obliteration of the enemy where he stood. Each force made its own contribution, in concert with the other, by the methods best suited to it. Here was no parochial idea of one arm striking while the other did its best to help, but a conception of



The music starts. A shadow arm rises to strike the gong which scrambles the S.A.A.F. Bostons into the air—a symbol of the ominous crescendo over the desert on the afternoon of October 19th.

two strong arms—an ambidextrous power—both striking at the same enemy. It should be emphasised that this is an account only of the air power which was used in the battle and that it cannot pretend to give more than the sketchiest outline of the already historic battle fought by the 8th Army.

The opening assault on Daba airfield by a comparatively small force of fighter-bombers on the morning of October 19th caught the Luftwaffe a little on one foot. After their experience of the "weather blitz" 10 days earlier, the German airmen probably expected the real concerto to open with a crashing tutti from the full orchestra. The roll on the kettle-drums was not recognised as the opening bars. They did not therefore at once turn their whole fighter strength into battle, and throughout the day we lost one Kittyhawk.

Yet the music had indeed started. There was an ominous crescendo in the afternoon when a strong formation of Baltimores and Mitchells, swarming with fighter escort, appeared over a landing ground at Qotafiya. From the pattern of their bomb bursts sprang three large fires, one visible at a distance of 50 miles. For the rest of

the afternoon and into the short evening Kitty-hawks darted here and there over the enemy landing grounds, bombing and making away again. That night the Wellingtons bumbled overhead, bombing as the flares from the Albacores burst into a brightness to rival the moon and floated gently in the sky.

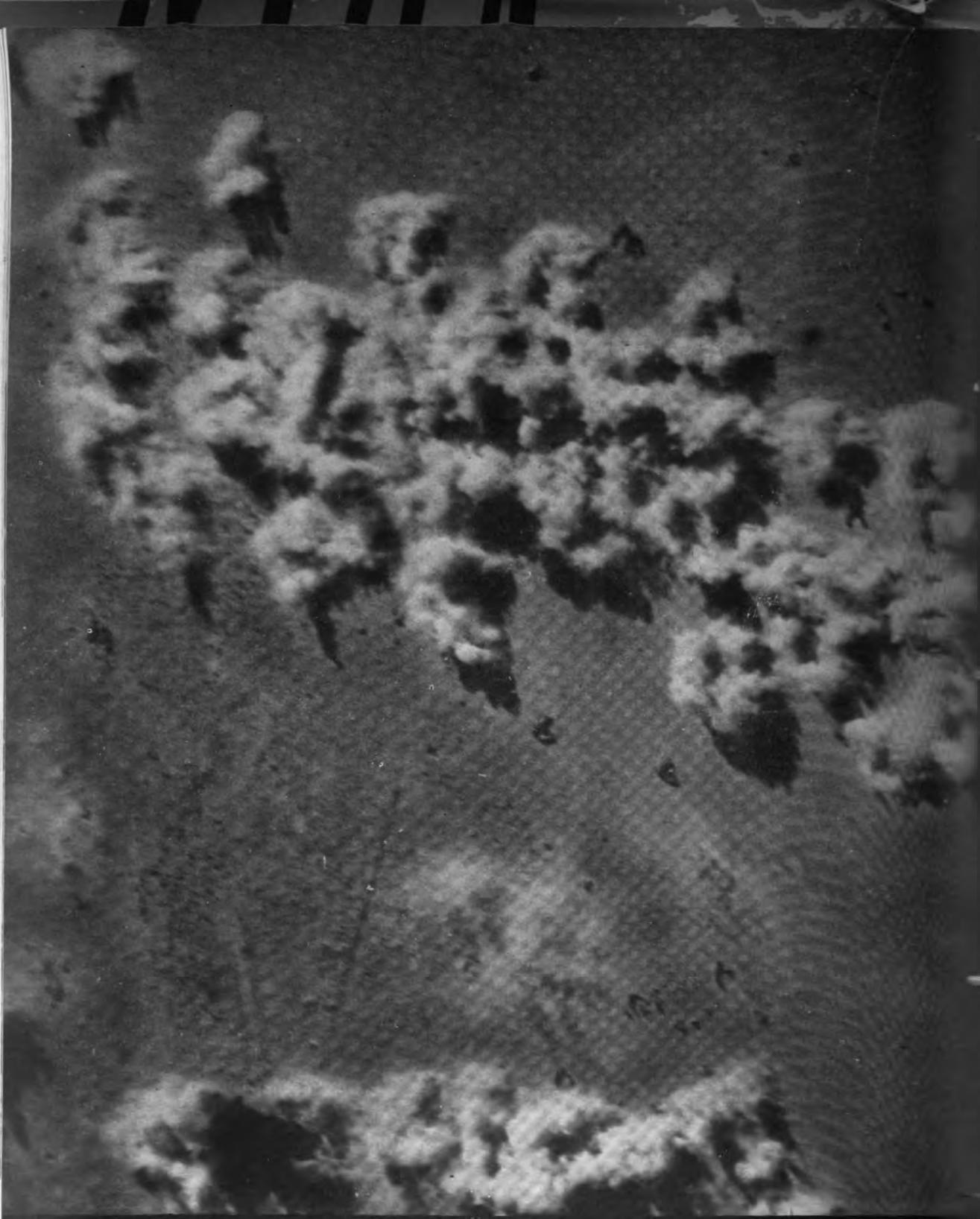
Next day the Luftwaffe had probably still not made up its mind whether this were the real assault, but its commanders knew certainly that they were losing too many aircraft on the ground. They sent up their fighters in force. Not all of them even got into the air. Seven Messerschmitts started to take off from Daba just as one of our raids sailed overhead; the bombs burst among them as they ran across the ground, and none was afterwards seen in the sky. The attack was developing. From early morning the light bombers and their escorts were forming up to bomb the landing grounds at Daba and Fuka all day long. The big raids were interspersed with swift sallies by fighter-bombers alone. Continually fighter patrols swept the battle area, enlarging their territory ever farther and farther towards the west, with the Spitfires in that deceptively gentle flight high on top. It was a day of scattered air combat in the course of which each side lost 11 fighters. German A.A. gunners also shot down one of our bombers. The Wellingtons saw to it that the men who had been bombed all that day on Daba slept little that night.

October 21st was a disappointing day, almost a lull in the battle. For this the weather was responsible. Thick banks of cloud built up over the desert. Three waves of light bombers tried to pierce them during the day in order to bomb Daba, but it is doubtful whether their bombing was satisfactory; the crews could see few results.

The following day the desert striking-force began to show the enemy that air power for which it had striven and trained so long and which it now wielded with such suppleness. Not only were there three big raids on Daba but our fighters deliberately began to patrol, not over their own landing grounds, but over those of the enemy. Back and forth they cruised over Daba itself for periods of a quarter of an hour or more, again and again throughout the day, challenging the

The Bostons go out. It was planned that air power should strike the first blow in the battle of Alamein, by knocking out the Luftwaffe on its landing grounds.



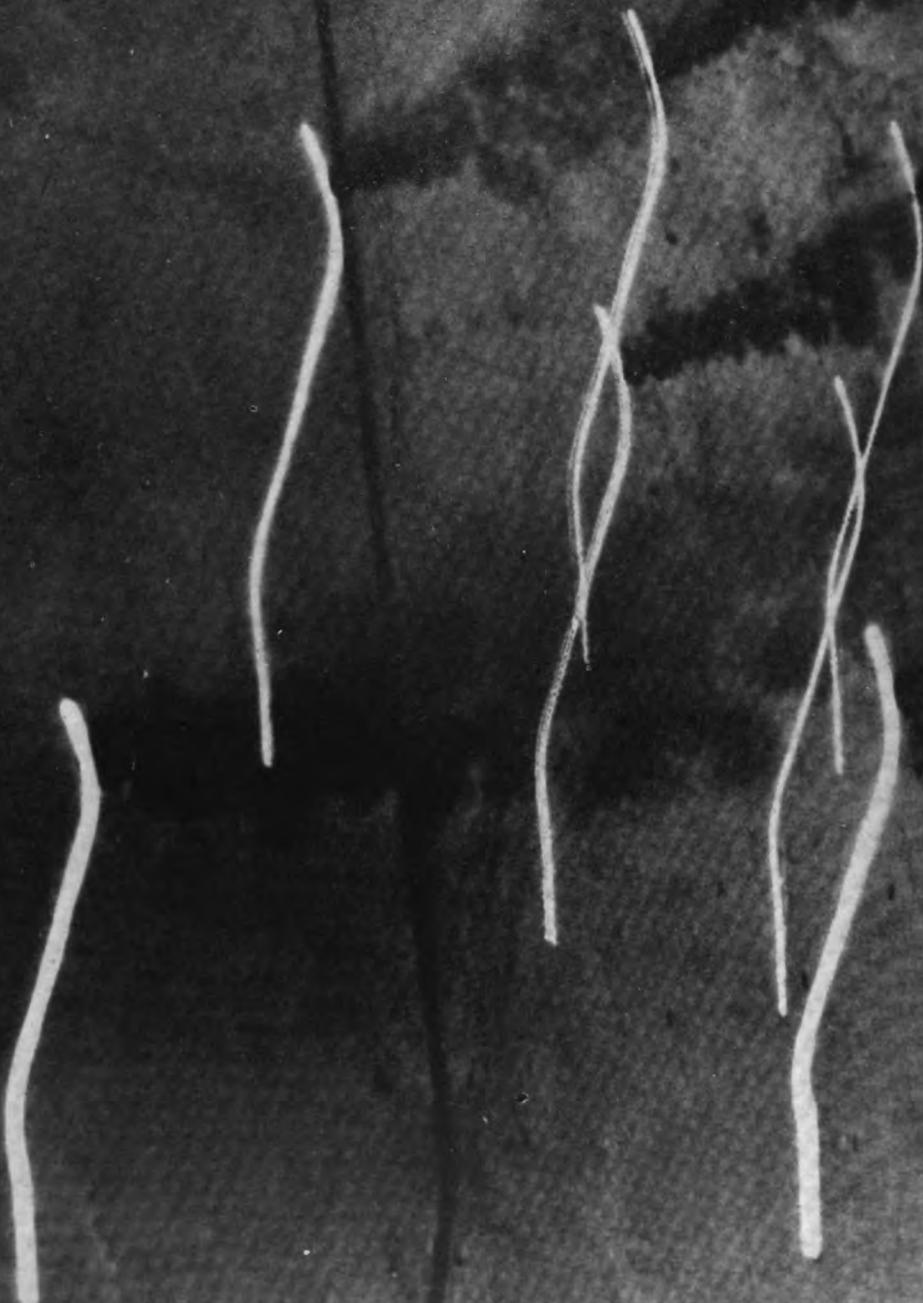


One hundred and fifty bombs crash down on the landing ground at Fuka



The enemy aircraft can be seen dispersed in blast-pits; already two are on fire.

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THE CRESCENDO AT ALAMEIN

Messerschmitts to come up and fight. This had never happened before in the desert. Fighter attacks on airfields of either side had been swift, hit-and-run affairs, a moment or two of destruction and away.

When first the Messerschmitt pilots looked up and saw patrols of Spitfires weaving steadily over their own tents they must have jumped into their aircraft with great confidence. Those Spitfires, sitting up for a fight over the whole enemy fighter force, were asking for trouble; the Messerschmitts came up to show them the foolishness of such tactics. Four Messerschmitts were promptly shot down on to their own airfield. No Spitfires were lost. The patrols flew steadily on. From that moment the Luftwaffe was completely on the defensive.

It is true that our pilots were still suffering losses in other ways. Those escorting the bombers had a hard time of it, losing five for only two of the enemy, and a bomber to the A.A. gunners. But that night the Wellingtons came in force, supplemented also by light bombers which switched from daylight to darkness. Again Daba was the target. Fires and explosions pitted the night face of Daba as they had pitted the panzer laagers during the September battle in the south. There was no stopping the orchestra now, and the Luftwaffe knew it. They sent up a few night fighters and one of those was shot down. They had lost the power to defend their own airfields by night, when the Wellingtons came all through the dark hours, or by day, when the Spitfires calmly swept back and forth above them, as one pilot put it, "admiring the fine desert view, very clear out to the coast and a light haze over the sea."

That first phase of the Battle of Alamein, fought by air power alone against the enemy air force either in the air or on the airfields, was estimated at the time to have reduced the serviceability of the German and Italian squadrons to between 15 and 20 per cent. of their numerical strength. In normal circumstances their serviceability, their actual fighting strength at any one time, would probably have been in the desert about 50 per cent. of their total numbers. In other

words, that first phase of the battle wiped out during the relevant days roughly three-fifths of the enemy's desert air power.

Later, the actual results of that bombing were to be inspected on the landing grounds at Daba. They more than supported the estimate.

* * *

At 2200 hours on October 23rd the first wave of more than 70 bombers and flare-dropping aircraft switched the nightly attack away from the enemy landing grounds on to his troop positions all along the battlefield. More than 30 Hurricanes trained in night flying started at Alamein and strafed as far back as Fuka. It was a night of bright moon, brighter far over the desert than the moon ever is in Britain. The horizon itself was dimly visible and every tent had a moon shadow.

As the bombers kept on and on through the night, the usual fires and explosions broke out on the desert below. There was one fire in particular in the south throwing smoke to 3,000 feet, while in the north a large ammunition dump was blown. There were several rocking explosions. At first the aircraft were met with strong A.A. fire, but later in the night it dwindled. It was not the bombing which accomplished that, although with the help of flares Wellingtons knocked out a number of gun positions during the night. The enemy gunners' attention was distracted elsewhere. Suddenly the battle line sparked with gun flashes. For 20 minutes 800 Allied guns fired continuously along the front. The artillery had opened fire, the sappers and infantry were moving steadily forward into the enemy minefields, storming Miteiriya Ridge. By dawn they had made and held two gaps in the minefields.

They had been assisted by a few light bombers which flew at a low level across the minefields and laid smoke screens at the points of assault. Others laid them at points where no assault was intended, just to make things a little more difficult. One indeed was busily laying a smoke screen along the beach at Ras el Kenayis, off which some British warships were manoeuvring with a great show of gunfire and commotion. So well did they deceive the enemy that next day Rome radio repulsed with heavy losses a British landing on the coast at Ras el Kenayis, which in fact had been neither intended nor attempted.

"The bombers kept on and on through the night."
Seven fires, lit by Wellingtons in the battle area below, have registered while the camera shutter was open; the photoflash reveals seven plumes of black oil-smoke rising from them.

It had become a tradition of the Desert Air Force that on critical days of land warfare it should create a new record in the air. It did so on October 24th, the first full day of the land assault. The total number of fighter, fighter-bomber and bomber sorties flown during the day was nearly 1,000. The moon was still bright against the dawn sky when the first escorted light-bomber raids took off for the battle area; it had not completely paled before three such formations were in the air. The sun had set before the last of the bombers touched down for the last time that day.

The whole weight was flung against the battle area, chiefly just west of the two gaps which our infantry held in the minefields. In addition there were two smaller raids on Daba landing grounds, still further to discourage the Luftwaffe. Not that the enemy air forces were very troublesome. After the days and nights of attack which they had sustained, they thought more of warding the bombs from their own dispersal areas than of intervening in this first day of full battle. A small number of Messerschmitts and Macchis made a few half-hearted attacks, and towards evening a few fighter-bomber raids were attempted by some Messerschmitts. Compared with the display of Allied air power, the enemy air forces amounted to nothing on that day. There were plenty of targets for them, since all our armour lay behind the minefields waiting for the gaps to be enlarged sufficiently for it to pass through. But the Stukas did not come.

Chief opposition to our bombers came from the German ground gunners. Having at that time no tanks to meet they swung their guns upwards and filled the sky with shells. In the course of the day six bombers and five fighters were shot from our formations. It was the heaviest bomber loss we had ever suffered in fighter-escorted raids; on the other hand, it was the heaviest bombing assault the light squadrons had ever delivered.

All day long faint, artificial dust storms hung over the landing grounds, created by the wheels at take-off. Ground crews toiled as nobly as ever, air crews took scant rest between raids. They had the moral fillip of knowing that this was the first grand assault from our side in which such raids had been employed. Already they had proved what they could do in defence, but now was the opportunity to attack. As they flew the air crews gazed down at countless flashes of

gunfire. Little white puffs of exploding shells spattered the desert air below them like "handfuls of flung rice." By midday pilots were already reporting areas of broken trucks, many ablaze, some burnt out and still smouldering.

Similarly that night the Wellington crews could see battles being fought beneath them in the moonlight, tiny silent movements, shadowy plumes of dust, sparkles of shellfire. Somewhere down there the infantry had widened the gaps and the tanks and guns were passing through, roaring down tracks marked by the half-glow of shuttered lamps. Bombs started many fires ahead of them, one at Rahman by the coast burning fiercely for five hours. It was dawn before the last Wellington drew away; by then the tanks and guns were all west of the first line of enemy minefields—he had in all three defence lines, one behind the other—and the infantry solidly held the bridge in the rear.

By daylight on October 25th, the ground position was that the 8th Army held a bulge in the north of the Alamein line a mile or two away from the coast. This bulge was nicknamed "the fist." Away to the south the attack had been sufficient to pin down the enemy armour opposing it, but the commanding Himeimat Ridge had not been taken. From "the fist" down to Qattara the line ran more or less straight, due north to south.

That day, the second of the land battle, the Luftwaffe pulled itself together and made a challenge which cost seven Messerschmitts definitely destroyed and many more probably destroyed or damaged: we lost one Kittyhawk. The challenge was sufficient to switch a lot of the light-bombing strength back on Daba and Fuka, but insufficient to cut down the bombing programme by a single sortie. Insufficient, too, to curb the Beaufighters which were ranging the back areas, shooting up supplies. Seven of them found a merchant ship and a destroyer which had nearly succeeded in reaching Tobruk. They lay only a mile off shore and a few miles west of the port. The Beaufighters' cannon attack, though it left both vessels with smoke drifting upwards, was not strong enough to sink them. Having shot down two Ju.88s and a Dornier flying boat, the Beaufighters hurried back to their base to lead out a striking-force of bombers and torpedo-carriers. The torpedoes missed, but a bomb from a Bisley blew the merchant ship to pieces and she sank in a few minutes. One of

the Beaufighters shot down two Italian CR.42s, obsolete fighters the very presence of which indicated the straits into which the airfield bombing had forced the enemy air forces.

Shortly afterwards another force of eight Beaufighters cut into the enemy air-supply route from Crete to the battle. They found some 35 Ju.52 transport aircraft escorted by six twin-engine Me.110 fighters a few miles north of Tobruk. Some of the Beaufighters held off the Messerschmitts, shooting one of them down, while the remainder went for the Junkers. Although in the end they claimed only four of these big aircraft as definitely destroyed, that is probably a considerable under-estimate; the outline of wings was seen sinking beneath the water, columns of smoke were seen rising from it.

The battle on the ground was taking a definite shape by October 26th. "The fist" had wedged its way more firmly into the enemy's face, broadening out to the north and south. Our troops held the whole of Miteiriya Ridge, and the tanks were embattled in strong defensive positions

against which the enemy was permitted to wear out his armour. In the northern sector alone he had already lost some 70 tanks, one armoured division being reduced after only 24 hours' fighting to about five runners. Another had been brought up from the south by a night march and was put into battle together with the 90th Light, veterans of the Afrika Korps. As they moved by night they were bombed, as they tried to form up by day they were bombed. In all there were nine full-scale light-bomber raids during the day, from which not one bomber was lost, while numerous formations of fighter-bombers slipped down to the south and wiped out four tanks and two armoured cars.

High over the battle swept the Spitfires, still firmly holding their front line over Daba; the Kittyhawks, darting far past that line, fired several petrol convoys on the coast road around Sidi Barrani. The Luftwaffe was still trying, still losing. During the day 17 enemy aircraft were shot down by our fighters, one by a Boston bomber and one by small-arms fire from the ground.

The desert does not burn. Every fire on the ground meant an enemy truck, or a supply dump, or an aircraft destroyed.



IV. K N O C K - O U T

12—The Water Gates Slam, the Fist Drives Home

BUT the greatness of that day, October 26th, lay out to sea off the Tobruk coast. The enemy was badly short of many things, thanks to weeks of air attack on his supply lines, but particularly he lacked petrol. A great deal depended on a convoy of two merchant ships, one of them carrying petrol, and a tanker which reconnaissance aircraft had discovered steaming south from Crete escorted by four destroyers. Four separate air striking-forces were sent out in succession to attack this convoy, guided by an exemplary series of reconnaissance flights. The first force of Beauforts and Bisleys escorted by Beaufighters took off in the early afternoon and was over the convoy about 18 miles north of Tobruk. The air crews were told that the destroyers were unimportant but the supply ships had to be sunk.

The attack was carried out at low level, the Beauforts skimming in from several directions to launch torpedoes, while the Bisleys swept at mast height over the ships, spewing out their bombs. One Bisley pilot collided with the mast of the tanker and the aircraft plunged into the sea. In all, six aircraft were lost from this first striking-force, but not before they had accomplished their purpose. The tanker was struck at almost precisely the same moment by four bomb hits on her stern and a torpedo in her hull. She exploded in a great sheet of flame. Her complete bridge was flung so high into the air that one airman took it to be an enemy fighter and shouted to the rear gunner to "have a crack at it." Of the two other supply ships, one had possibly been hit by a torpedo, the other was smoking. The crews had no time to observe any other results in detail. They were flying through a desperate barrage of shellfire from all four destroyers and from the supply ships themselves.

The second striking-force of Beauforts and

Beaufighters was unfortunate in not finding the convoy. The Beauforts consoled themselves by attacking a long barge near the coast. The Beaufighters destroyed two and damaged the rest of five Heinkel bombers for the loss of one of their own number.

There was now some anxiety about this convoy. Already the afternoon was shortening towards an autumn dusk. The tanker had gone, but what of the other two ships? There remained a chance that they might make Tobruk to pump fuel into the German tanks. Towards tea-time a large force of U.S.A.A.F. bombers was sent against the ships. They scored two hits and four near misses on one of them, but were unable to tell whether it had actually been sunk.

At dusk, therefore, three torpedo Wellingtons were borrowed from the night force. Through the failing light they could see the larger of the two merchant ships just outside the mouth of Tobruk harbour itself. Documents which were later captured said that both Rommel and Kesselring, his air commander, were standing on the twilit cliffs by Tobruk watching this last ship make a bid to bring in the petrol, for every gallon of which they had ten uses. If that is true, they saw the three Wellingtons run up in a perfect torpedo attack. Several of the torpedoes struck the vessel, which exploded with force, flinging debris high into the air and resolving into a tall column of oily black smoke. One Wellington, hit, was last seen making for land. Another force which came at night found only the original tanker, blazing from bows to stern and periodically belching explosions.

Our air power had destroyed that convoy, ship by ship, the last while there was still daylight, with night bombers within easy range of the enemy's fighter airfields and, it may be, in full view of the

Air power is at its zenith. It strikes in the air, over the sea, behind the lines, in the battle area. The German armour disintegrates, retreat becomes rout. An army is broken and an air force destroyed.

enemy army and air commanders. The captured documents do not report what comment Rommel made to Kesselring.

Army formations in the desert "fist" which had watched the light bombing only a few hundred yards in front of them that day signalled to the air forces in the evening, "Good show. Keep it up." Next day there was need to do so, for all the available German and Italian tanks were gathered together in an attempt to deliver five counter-attacks. Each of the five attempts to concentrate received the force of two big bombing raids, scattering the tanks and trucks into the best form of cover that exists in the desert—dispersal. What smaller attacks could be launched wasted themselves vainly on the guns of our own tanks and artillery.

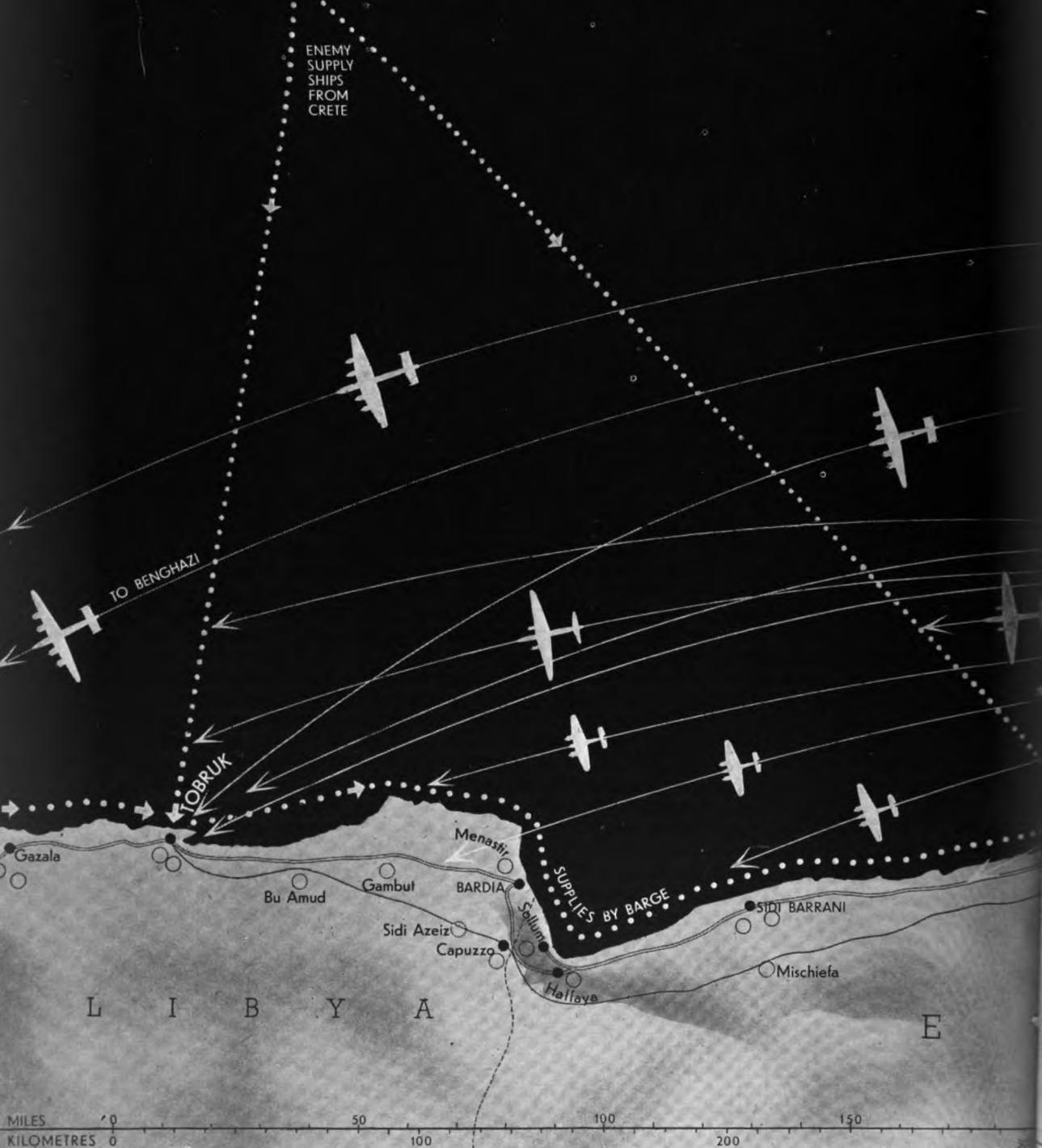
October 28th was probably the day that decided the victory, even though the battle was fought furiously for several days after that. During the morning the airfields were somewhat idle for lack of good bombing targets. The Kittybombers made a number of sallies at Daba landing grounds. To commemorate the second anniversary of the Italian attack on Greece, a fighter squadron of the Royal Hellenic Air Force strafed what was thought to be an Italian desert headquarters. The bomber crews, however, stretched their legs a little, lingered for the first time over lunch in the mess. But in the early afternoon everything changed. The whole of the Afrika Korps, what remained of it, was trying to form up for a final full-scale counter-attack against "the fist." It should be appreciated that, in conditions of bombing, no armoured force can launch a big attack until it has first collected its units from dispersal and arrayed them for battle.

At once on all the light-bomber airfields field

telephones rang, briefing tents were crowded, air crews bundled their flying gear, maps, parachutes into trucks which waddled off through the dust to the dispersed aircraft. Propellers were already starting, wheels taxiing across landing grounds, the first formations taking off in line astern. From the neighbouring landing grounds came the Kittyhawks, twisting and weaving in the bright sunlight; from yet others the Spitsfires, reaching for the higher air.

Within the space of the next two and a half hours they carried out seven full-size bombing raids on the Afrika Korps. They dropped 80 tons of bombs in an area measuring some three miles by two. Pattern after pattern of bomb bursts spread from all directions across this area of concentration. Six times the German tank crews broke hastily and scattered across the desert; six times they re-formed. The seventh time they did not re-form. There was no counter-attack by the Afrika Korps. Not again did the enemy try to take the initiative.

That night, to the same accompaniment of our flares and bombs, the infantry attacked north from the extremity of "the fist." By morning they held a salient sticking out towards the coast, nicknamed "the thumb." It was particularly appropriate that when the bomber crews crowded to the briefing tent next morning to study the bomb line, they found it in the shape of a clenched fist with the thumb up, the cheerful and unofficial greeting which Tommies all over the world have adopted in reply to the pompous outraised arms of Nazi and Fascisti. Moreover "the thumb" pinned against the coast four battalions of Germans and Italians, whose only hope of escape lay through the closing corridor along the shore which was carefully bombed whenever it showed any signs of activity. The



Air power strikes. As the decisive battle drew near, the R.A.F. turned on the enemy the full fury of that air power for onslaught by day on the battle area and on the landing grounds and supply routes immediately behind. Each night the heavy bombers from Palestine slammed the distant back door at Benghazi. Behind this great effort, at so many points



HEAVY
BOMBERS
FROM
PALESTINE

TORPEDO BOMBERS,
BEAUFIGHTERS,
NAVAL
CO-OPERATION

ALEXANDRIA

Amriyah

DESERT AIR-
FORCE (LIGHT
BOMBERS,
FIGHTERS)

NIGHT
BOMBERS

Wadi
Natrun

Ras el Kenayis
Qasaba
Sidi Haneish
Fuka

Qotafiya

Daba
Ghazal
Rahman
Tel el Aqqaqir

ALAMEIN

battle
area

Ruweisat Ridge

P

Himeimat Ridge

G Y T

250 400 300 500 350 600 400

which they had striven and trained so long. The fighters and light bombers based on Amriyah began a terrific continuous bombers from Wadi Natrun took over. The Coastal Force from Alexandria sank every oil tanker that made for Tobruk. over a vast area of land and sea. lay a single strategy with a single purpose — the destruction of German power in Africa

imprisoned battalions did not escape, while the strength of the German armour was sapped still further in small actions by our own tanks and guns.

Air power did not play a great part in this phase of the immediate battle area. Bombing attacks continued, as did the fighter sweeps, but the targets were not sufficiently concentrated to make an all-out effort worth while. It was possible to hold the bombers a little in reserve and at the same time to increase interference with the enemy's supplies.

It had become even more desperately necessary for the enemy to get some ships into Cyrenaica. Despairing for the moment of Tobruk, he decided to try Benghazi. On October 28th a tanker and a supply ship were sent south from Italy. Torpedo Wellingtons found them off Zante Island. The first Wellington got a torpedo hit on the supply ship. The second, attacking half an hour later, could not find the supply ship at all but hit the stern of the tanker, which caught fire along her whole length. Reconnaissance aircraft, which swept widely over the area next morning, found only wreckage and oil. The first convoy failed.

Three nights later the enemy tried again. By now it had to be Tobruk or nothing, for there was clearly not going to be time to bring the petrol by barge or by road all the way from Benghazi. Two ships laden with petrol were sent from Crete under cover of night with an escort of two destroyers. They were not molested until they were 38 miles from Tobruk, when the crews heard the sound of Wellington engines. Swiftly the destroyers circled to lay a smoke screen, round which the Wellingtons searched for a gap, while others released flares from above. It happened that a flare dropped just at the moment when one of the Wellingtons had found a gap, silhouetting one of the ships against the smoke curtain beyond. The pilot was theoretically too close to launch a torpedo, but he made a steep diving-turn to get into some sort of position and released one. It hit the ship. A brilliant red and orange flame topped with debris rose to a height of 1,000 feet, and when it subsided the ship was gone. One, however, had escaped. By dawn the destroyers were shepherding her only 25 miles from Tobruk. A force of Beauforts found her there, flew low through heavy A.A. fire and torpedoed her amidships. There was a similar explosion of flame and debris. A

few seconds later the destroyers were searching what was only a pall of smoke drifting away from a foaming patch of sea. The second convoy failed.

Normally the enemy would have waited several days before attempting to run the blockade for a third time, but Rommel's need for petrol was too urgent. The following night the third convoy sailed from Crete. A night striking-force of Wellingtons hit two of the escorting destroyers but missed the two petrol supply ships. At dawn, therefore, the Beauforts flew again, escorted by Beaufighters. They found the convoy 60 miles from Tobruk with an umbrella of aircraft, which the Beaufighters at once folded. Only one destroyer remained, firing wildly in all directions as the Beauforts closed in. The smaller ship was hit by several torpedoes. She came to a stop, a drift of smoke appeared on her decks, thickening into a tall black pillar against the sky. Several more torpedoes struck the larger vessel. She seemed to hesitate for a moment, to tremble; then she blew right out of the water. "Scarcely enough wreckage remained," said one of the airmen, "for a drowning man to cling to." The third convoy failed.

That was the last enemy convoy to try to make Tobruk. The water gates to Cyrenaica had been slammed shut from above and from below, for submarines of the Royal Navy were having equally striking success. The attack on the shipping was organised by co-operation between air power at Malta, air power in Egypt, and naval power beneath the surface of the sea. One agency or the other sank nearly every ship that tried to reinforce Rommel. In the month before our land assault began at Alamein, only one ship got into Tobruk harbour. During a period of six weeks not a single tanker reached Tobruk.

Back in the immediate battlefield of the desert the pattern had not much changed. "The fist" still waited, "the thumb" had been extended practically to the coast. Bombing by day was at rather smaller strength, lacking good targets, but at night it continued as fiercely as ever. Most nights the Wellingtons, which spread the attack from dusk till dawn, numbered close on 100. From the night when the land assault started until the end of October they dropped about 1,750,000 lb. of high explosive on the battle area alone. The damage it wrought was heavy.

The remarkable precision of such bombing is not perhaps apparent to anybody who has not been in the desert. There are no buildings to



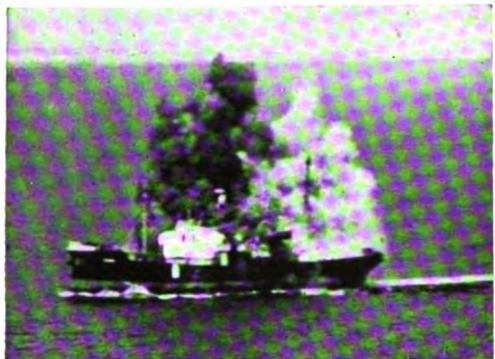
Six times the Afrika Korps grouped for counter-attack, six times as the bomb-bursts spread among them the German tank crews broke and scattered across the desert. The seventh time they did not re-form. This day, October 28th, was the decisive day at Alamein.

catch fire, no congested areas to gut. The bomb aimer sees below him in the light of the moon and the flares only miles and miles of nothing at all, faintly dotted here and there perhaps with a few shadows. He knows that beneath him are the battle forces of the enemy, each truck, each tank, each dump of material carefully dispersed as widely as possible over sand. Every fire that starts, every explosion that cracks means that something of importance has been hit. If a thing were not important it simply would not be there. At one time it was thought that night-

bombing of troops in the desert would be a waste of time, completely ineffectual. So it would have been without the long-trained skill of the Wellington crews and particularly the work of the naval airmen who dropped the flares, and upon whom so much of the success depended.

The last day of October and the first of November were remarkable in the air only for a few scattered incidents. It was correctly thought that the German Panzerarmee Headquarters had been identified. A flight of Spitfires was dispatched to strafe it. As they swept across with

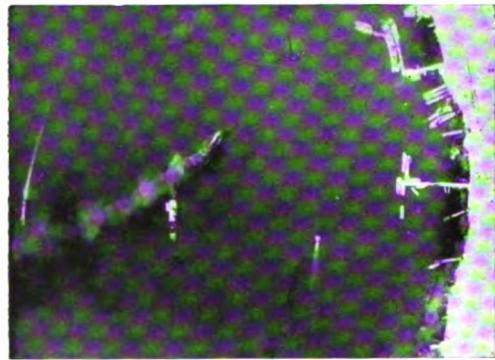
Throughout the long campaign, the Coastal Force harassed Rommel's sea



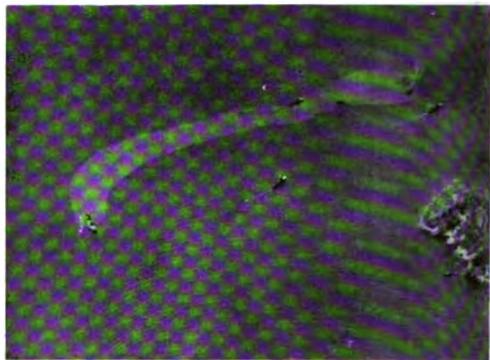
1. Crew of a bomber look back at a direct hit on a supply vessel, early in the campaign.



2. Tracer from a Maryland converges on a merchant vessel. Between each pair come several bullets.



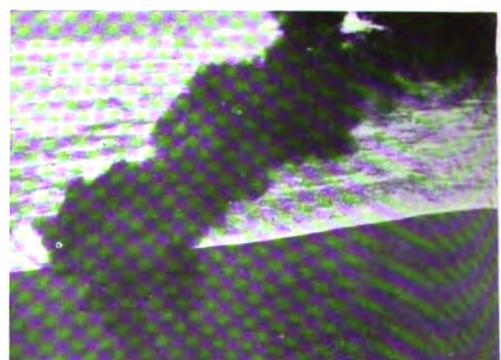
3. U.S.A.A.F. heavies leave supplies ablaze in Tobruk harbour. The battle of Alamein is raging on land



4. Beauforts leave a stream of oil a mile long issuing from both sides of a tanker in the Ionian Sea.



5. Supply ship on fire and sinking, hit by the R.A.F. on "the roof" between Crete and Tobruk.



6. Dense clouds of oil-smoke drift slowly upwards from a tanker struck by torpedo aircraft off Libya.

utes. At the height of the battle of Alamein they struck decisively.



7. "Several of the torpedoes struck the vessel, which exploded with force, flinging debris high into the air and resolving into a tall column of oily black smoke."

their cannon firing, the pilots surprised a number of men walking from tent to tent, conversing outside a truck, some even washing their clothes in improvised tubs. The Spitfires destroyed many vehicles and tents, they left the place a smouldering ruin, but they did not know at the time that they had killed General der Panzer Truppen Georg von Stumme. General von Stumme, at that time in command of the German armour, had until a few days previously been filling Rommel's place during his much-publicised visit to Berlin. It will probably not be known until after the war exactly how General von Stumme died, except that it was during this strafing attack.

That night, November 1st/2nd, the deciding blow was struck on the ground and in the air. "The fist" punched hard to the west, aiming at the Rahman track around Tel el Aqqaqir. At the same time more than 100 aircraft roamed the battle area for seven hours, bombing and strafing. There were scores of fires and explosions, some of great size. By dawn the 8th Army had split the enemy armour, some of it to the north, some to the south. Our own armour was through the minefields and free to manœuvre in the open country to the west.

The enemy reacted furiously in some of the fiercest tank battles of all, which were fought throughout the following day. As usual on a day of crisis, the light bombers and fighter-bombers created a new high record for the number of sorties. It was the heaviest air attack since the battle had begun; by nightfall more than 100 tons of bombs had been dropped on the German positions by the light bombers alone. They might have been excused that day had they sometimes bombed our own troops, for the armies were entangled with each other. On one occasion, a German tank regiment cut right through our lines and back again. Yet in fact not one bomb was misplaced. The ground control-staff, which had been practising for months a radio liaison with the Army, kept the bombing squadrons exactly informed of the targets they could attack, sometimes only a few hundred yards from our own forces. The thing worked perfectly.

As pattern after pattern of bombs spread across the enemy positions, it broke the morale of some of his troops. Some of them came across with hands raised, nerve-shaken, weary, hungry, to say they could stand the bombing no longer. By nightfall it was evident that the enemy knew





It was too much. As pattern after pattern of bombs spread across the enemy positions, a trickle of Rommel's men began to come across, nerve-shaken, weary, hungry, to say they could stand the bombing no longer.

he would have to withdraw. Strong-points that had previously been stoutly held were suddenly found to be empty; all along the front small dumps were fired. Aircraft saw the first trickle of west-bound traffic on the coast road near Daba—the support formations starting to get out.

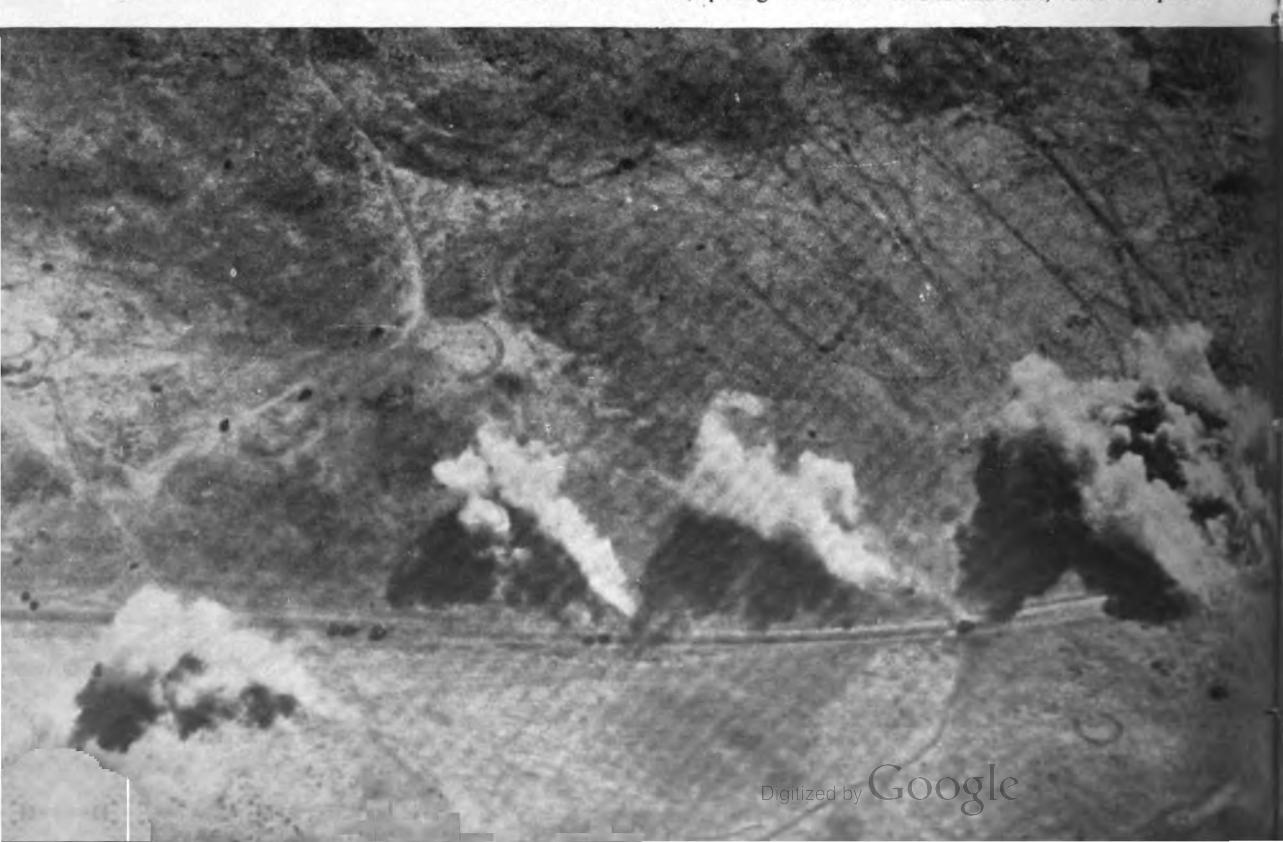
It was not yet, however, even a full-scale withdrawal, much less a retreat; nothing approaching a rout. The conditions for that had still to be created. Throughout the night the air assault continued at equal strength, next day it was even increased. It was, as distraught prisoners mumbled, the fact that the bombing never, never ceased—there was no relief, that was what did it. Seven big bombing raids had been over the northern sector of the battle before midday. Our airfields were clothed in a persistent veil of dust kicked up by the incessant take-offs. Airmen and ground crews alike toiled in this sweating, grimy fury of assault. At midday, reconnaissance reported that the withdrawal had been turned into a retreat, that enemy columns were pulling out to the west along the coast road. Within a few minutes the whole weight of air

attack was switched from the immediate area on to this road behind it, from Ghazal to Fuka.

Even at first the road traffic was moving slowly. After the first few attacks it was being twisted into a traffic jam. Bombing formations took the road methodically, section by section. Fighter-bombers in smaller flights freelanced up and down its length. Low-flying fighters swept it from east to west, firing until all their ammunition had gone. Soon there were places where the road itself was blocked by piles of twisted vehicles, the columns pulling out frantically on to the desert to by-pass them. The retreat was not hastened when the German troops pulled up their vehicles and jumped out to scatter across the desert every time an aircraft appeared. "As we swept the road," one bomber pilot described it, "we saw it packed with transport. But every vehicle was stopped, and everywhere there were tiny trails of dust where crews were running into the desert. Every bomber in our formation turned and sailed down the road, spilling bombs on vehicles and men. I never saw such a scene of destruction."

Neither side paid much attention by now to

"As the defeated army turned on its tracks, the whole weight of air attack was sailed down the road, spilling bombs on vehicles and men," said one pilot: "I never



K N O C K - O U T

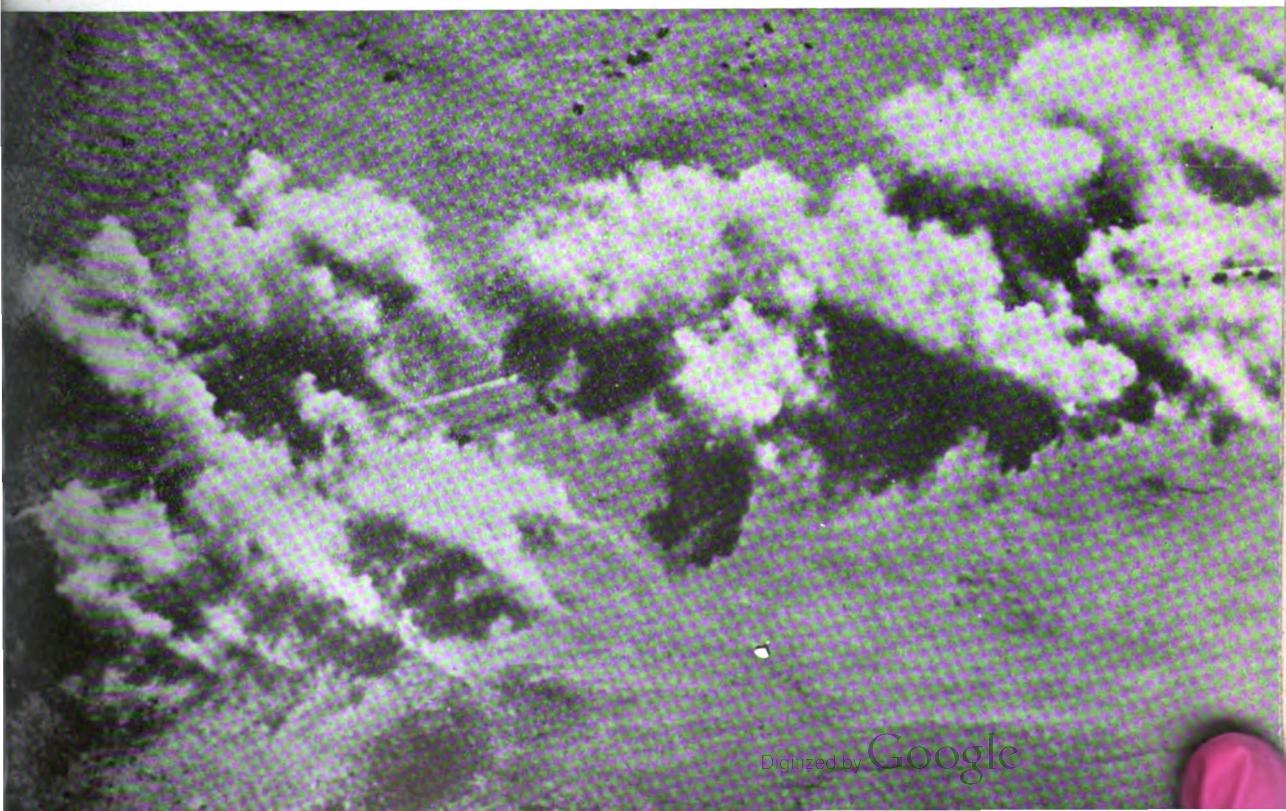
what was going on in the south of the Alamein position. The troops down there were mostly Italian and they had been tricked of their lorries and petrol by the Germans, abandoned to inevitable capture. In a few days R.A.F. bombers would be searching for them, not to bomb them but to drop them water and food in order that they might not perish before they could be taken prisoner. A few of our fighters had been kept in hand to deal with any attempt the Luftwaffe might make to interfere. They did in fact try two Stuka raids, the first of which jettisoned and fled when it was intercepted; of the second, eight Stukas and two Messerschmitts were destroyed, and some 17 more at least crippled. But these were only diversions. The Luftwaffe had practically ceased to exist as a force of any consequence in the battle.

The main preoccupation was the road. By dusk whole lengths of it were blazing with fires sufficiently large and numerous to provide all the light the Wellingtons needed to keep up the attack at night. This was the night for which those bombers had been waiting. They called it

"Bombers' Benefit." No longer might the enemy vehicles be scattered over hundreds of square miles of otherwise empty desert; they were concentrated just around the thin ribbon of the coast road lit by the torches of their own destruction. By the stretch of road that runs through Daba the Wellingtons started about 60 fresh fires. One pilot counted 30 burning furiously at the same time. The truck columns continued to drive westward throughout the night, hoping to traverse the area of fiercest attack under cover of darkness.

The road was so crowded that it reminded one pilot of the Brighton road on August Bank Holiday in days of peace. The bombers came down low to bomb, then lower still to open fire with machine guns. "As we came in to drop our first stick the vehicles careered madly off the road. It looked absolutely crazy. I saw one overturn as it went over the bank. We could see troops leaping out and running away like cockroaches. They were colliding and jumping head first into patches of scrub or any hole they could find." "Our first stick cracked right across the lorries at

switched from the battle area to the thin ribbon of road behind it. "Every bomber saw such a scene of destruction." This photograph was taken between Daba and Fuka.

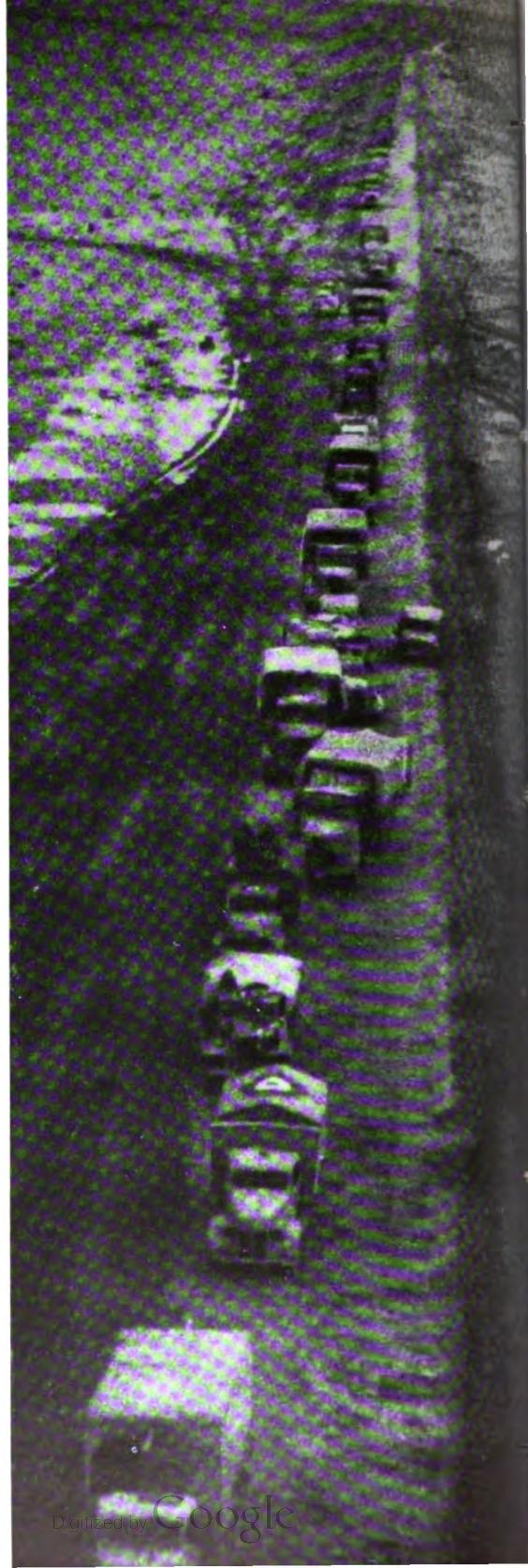


the right angle. We could see some of the lorries coming up in the air. . . . We went in low over a tented encampment and could see our tracer cutting through the canvas." Those two are typical of the stories with which the bomber pilots came back from this night of punishment.

It turned the retreat into a rout. Or rather, as the German radio put it next day, "Rommel resumed his freedom of movement." The only real freedom left to him was to move to the west, under unceasing bombardment, as far and as fast as his scant petrol stocks would permit, taking only the pick of his troops and abandoning the rest to the prisoner-of-war cage. All through that day, November 4th, the light bombers, fighter-bombers and fighters maintained the weight of their assault on the road, one fighter-bomber formation jettisoning the bombs to drive off and mutilate the only Stuka raid which the enemy attempted. At midday, General von Thoma, who had taken the place of General von Stumme, reported personally to Rommel that he was informed of large columns of British troops moving round his southern flank. Rommel, irritable and obviously shaken, declared that they could not be British, so von Thoma got into a tank to investigate for himself.

By evening, the famous Press communiqué had been issued to the world: "The Axis forces in the Western Desert, after 12 days and nights of ceaseless attacks by our land and air forces, are now in full retreat. Their disordered columns are being relentlessly attacked by our land forces and by the Allied air forces, by day and night. General von Stumme, senior general, who is said to have been in command during Rommel's absence in Germany, is known to have been killed. So far we have captured 9,000 prisoners, including General Ritter von Thoma, commander of the Afrika Korps, and a number of other senior German and Italian officers. It is known that the enemy losses in killed and wounded have been exceptionally high. . . ."

"Like the Epsom Road on Derby Day." The Eighth Army and the ground convoys of the R.A.F. squadrons move in pursuit of Rommel, an endless stream of vehicles nose-to-tail along the coastal road. It was a wonderful target for the Luftwaffe, but the Luftwaffe had been shot from the skies.



13—The Fury of Pursuit

WHAT A ROAD it was! If the retreating Germans and Italians had crowded the road through Daba like the Brighton road on August Bank Holiday, the advancing Allies packed it like the Epsom road on Derby Day. It is the width of only two vehicles, and at the best of times its edges tend to crumble. From Daba westwards the enemy had laid millions of land mines all the way along the edges of the road and the bordering desert, so that the traffic had to stick to the tarmac, though even so a truck went up every now and then with a roar and a column of black smoke. The tarmac itself was pitted with bomb holes, blocked here and there with burnt and twisted vehicles, flooded in the dips and hollows with the remnants of the October rains.

On to this road wound the ground convoys of the squadrons, taking their turn with the seemingly endless trails of army lorries. No matter where one stood, the road was packed nose to tail with traffic, mile after mile of it from horizon to horizon. Military policemen sweated at the task of pulling back the impatient spirits who tried to slip past along one side or the other, risking the mines. Small parties of sappers moved slowly along the roadside, prodding with their bayonets to fork up the land-mines which had been revealed by the detector apparatus they swung ahead of them on a long pole. Sometimes the traffic rumbled steadily forward for an hour or more. Sometimes it crept a few yards and halted while somebody miles ahead disentangled a jam, and the drivers stared curiously at the sign-boards in German and Italian which were perched at whimsical angles on the banks.

What a terrible road it was! It took one R.A.F. convoy all one day from dawn to dusk to travel 35 miles. It was probably the best bombing target that has ever been offered to the Luftwaffe—and not a single enemy aircraft came. A score of Stukas could have wrought some real damage on that road, a flight of strafing Messerschmitts could have fired dozens of lorries, killed hundreds of men. But there were no Stukas or Messerschmitts left in the sky; only Spitfires, only

Kittyhawks, Warhawks and Hurricanes. At night the columns pulled gingerly off the mined edges of the road to leaguer. A few Junkers or Heinkels could have plunged whole camps into disorder; but there were no Junkers or Heinkels, only Wellingtons and Albacores rumbling steadily westwards to pound at the tail of the retreating enemy.

What a sight was Daba, that had been so unmercifully bombed! Along the road itself and for miles on either side stretched hundreds of wrecked vehicles caught by the bomb patterns. The desert was scattered over with the litter of personal junk, torn papers, dirty clothing, water-bottles, kitbags. Here and there small parties of men were burying the corpses the enemy had abandoned, setting up those little graveyards of wooden crosses in the sand.

At Daba there was two-way traffic—the Allies advancing, the enemy prisoners trailing back. The prisoners seemed to be everywhere—thousands and thousands of unkempt Germans and Italians past any emotion save fatigue. Some of them were marshalled into big wire cages where they sat patiently on the sand without interest in their fate. Others had already been bundled into trucks and sent off down the road to Alexandria, one British soldier perched at the back of each crowded lorry more for form's sake than anything else, for these men were not going to escape.

To what haven indeed could they escape? No prisoner could escape half so fast as Rommel was running. Many of them patched up their own trucks and started to drive themselves back to Alexandria without any guards at all—eastwards, anywhere out of the bombing. They stared incuriously at the streams of advancing Allies, although one might lean sorrowfully from his truck now and then to salute a freshly-dug cemetery with German names on the wood. There was never a greater testimony to the power of bombing than at Daba, the testimony of these men who had been deprived of sleep and rest for a fortnight.

When the first few ground-gunners of the



"What a sight was Daba!" On the landing grounds were 50 aircraft, smashed by the bombardment before the battle. Some arriving squadrons were able to start their engines. Stacked against the railway track (below, right) were a further 39 wrecks.





... were shattered to nothingness, some lay twisted on their backs, wheels in the air, some were so little damaged that the craft, most of them Messerschmitts. These, which the Germans had had time to move, were the result of the "weather blitz."



R.A.F. Regiment took over the Daba landing grounds to prepare them for the squadrons, there were still between two and three hundred Germans and Italians wandering over them, asking to be made prisoner; a great nuisance the gunners found them, urging them at first to run off and find somebody less busy to capture them, but consenting at last to round them up and march them off to join the stream on the road.

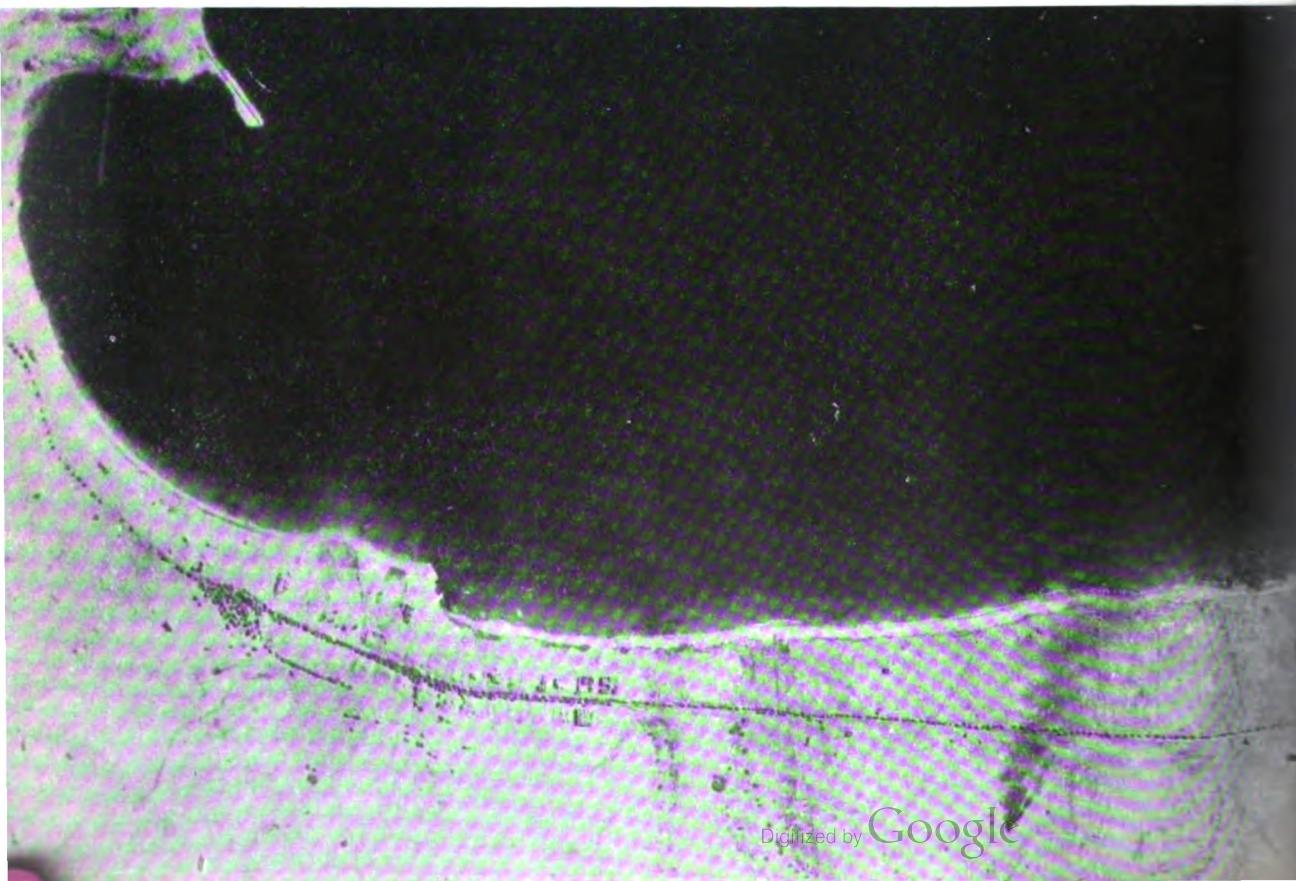
The landing grounds at Daba, of which there are three, were yet another testimony to our air power. Stacked against the railway track near the landing ground which had received most of the "weather blitz" of October 9th, were 39 wrecked aircraft, most of them Messerschmitts together with a great heap of twisted metal. It would seem that here was the result of the "weather blitz," all that the Germans had had time to cart away from the landing ground itself and dump by the railway in order that it might be removed for salvage. On the landing ground

were the results of those preliminary days and nights of air bombardment before the battle—some 50 aircraft in various states of disrepair. Some were shattered to nothingness, some lay twisted on their backs, their wheels sticking up into the air, some, including an Me.109 G, were very little damaged and the arriving squadrons were able to start their engines.

By November 7th the Spitfires and Kittyhawks were already flying from Daba. They encountered the first attempts of the Luftwaffe to take again to the air. By the end of the day they had shot down three Messerschmitts and three Stukas. They had also intercepted a formation of five Ju.52 transport aircraft striving desperately to rush petrol supplies over by air from Crete. They destroyed all of them. They burned angrily on the ground.

The chief functions of air power now and throughout the advance to Tripoli were two: to prevent reinforcements of men or supplies

A broken and disordered army in full flight. Part of a famous reconnaissance picture of Halfaya Pass and the kinds push and jostle to the West. In the Pass itself (not seen in the picture) and twice on the way to Sollum, road



reaching the enemy from the Continent of Europe; to attack without cease the retreating enemy army in Africa. The squadrons had also to maintain that complete air superiority which they had won, but the task was not to be so difficult as before; the enemy air forces had been so completely beaten that they were not again to make any serious challenge for command of the skies.

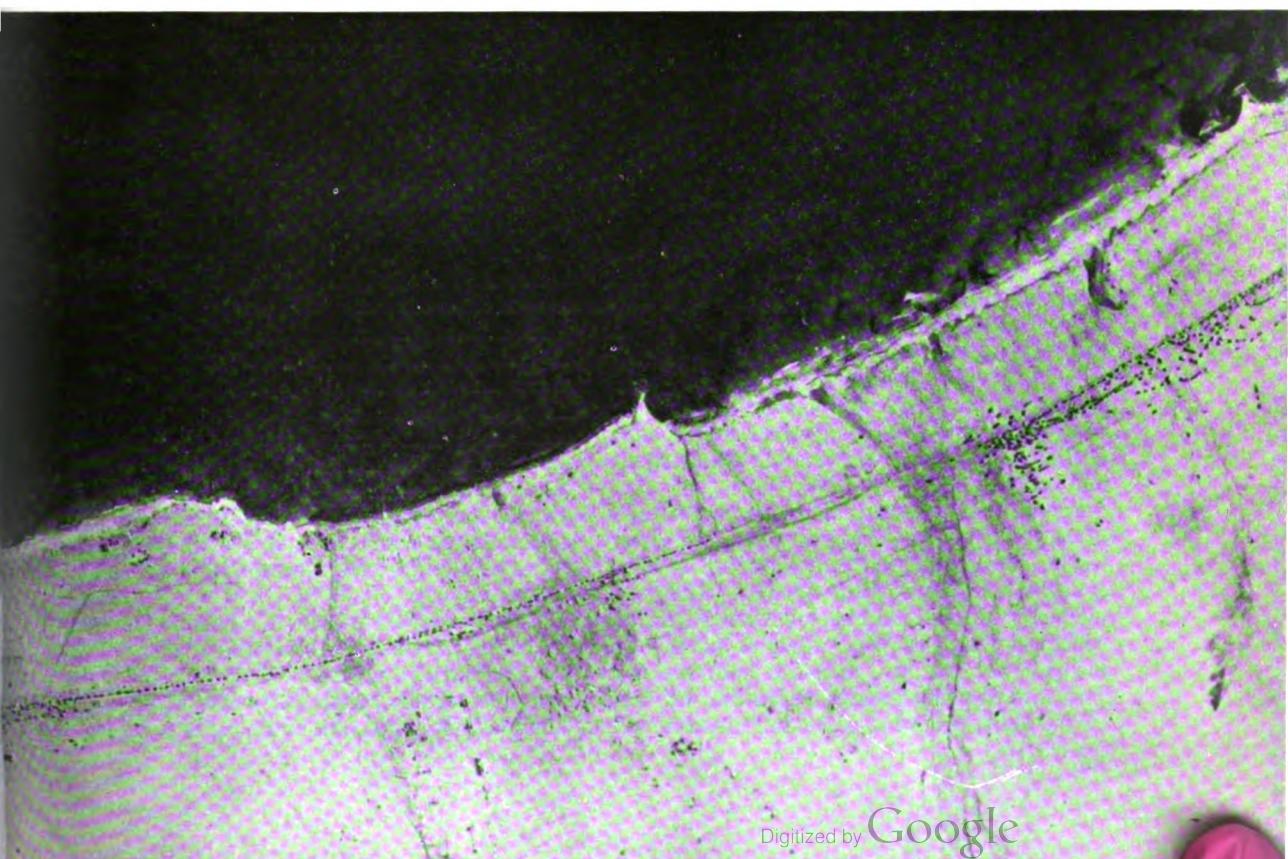
The task of intercepting supplies and reinforcements which came by sea fell to the medium and heavy bombers. With the advance, the targets fled farther and farther to the west, at first to Benghazi then to Tripoli, then at last to Tunisia. For, as if the victory of Alamein had been the signal for the Allies to attack everywhere—"the end of the beginning"—British and American forces had already landed farther west along the North African coast, and were advancing towards Tunisia.

The pilots of the desert force crowded nightly

to the few radio sets for news of this landing and its success. Heartily they cheered the success, with an inward hope that, if it were to be a race for Tripoli, they who had lived so long in the desert, and tried so hard, might be permitted to get there first. So they turned more vigorously still to the tedious job of getting the squadrons forward on the ground.

This job of getting the squadrons forward was the main preoccupation in carrying out the second task assigned to air power, to destroy as much as possible of the routed army where it fled. The light bombers struck a few blows at the bottlenecks of Sollum and Halfaya, and then they had to be left behind for a while and their role given to the fighter-bombers which use less petrol. Every gallon of petrol had to be brought forward somehow over the bare desert, every bomb, every bullet, every tin of bully-beef and, indeed, every mug of water, for the Germans had defiled all the wells behind them as they went. Most of it

last-road round Sollum Bay, as the Afrika Korps passes over them for the last time. Thousands of vehicles of all kinds have piled men and machines into a seething, sweating mass. Here and there, run into the desert, a lorry burns.





Caught by the storm of bombs, vehicles were scattered in ruin for miles on either side of the road.

had still to come by road, that crowded, painful coast road. But already all possible transport aircraft had been gathered from the African routes and already they were appearing in the desert, flying up the bombs, the petrol and, later, the water.

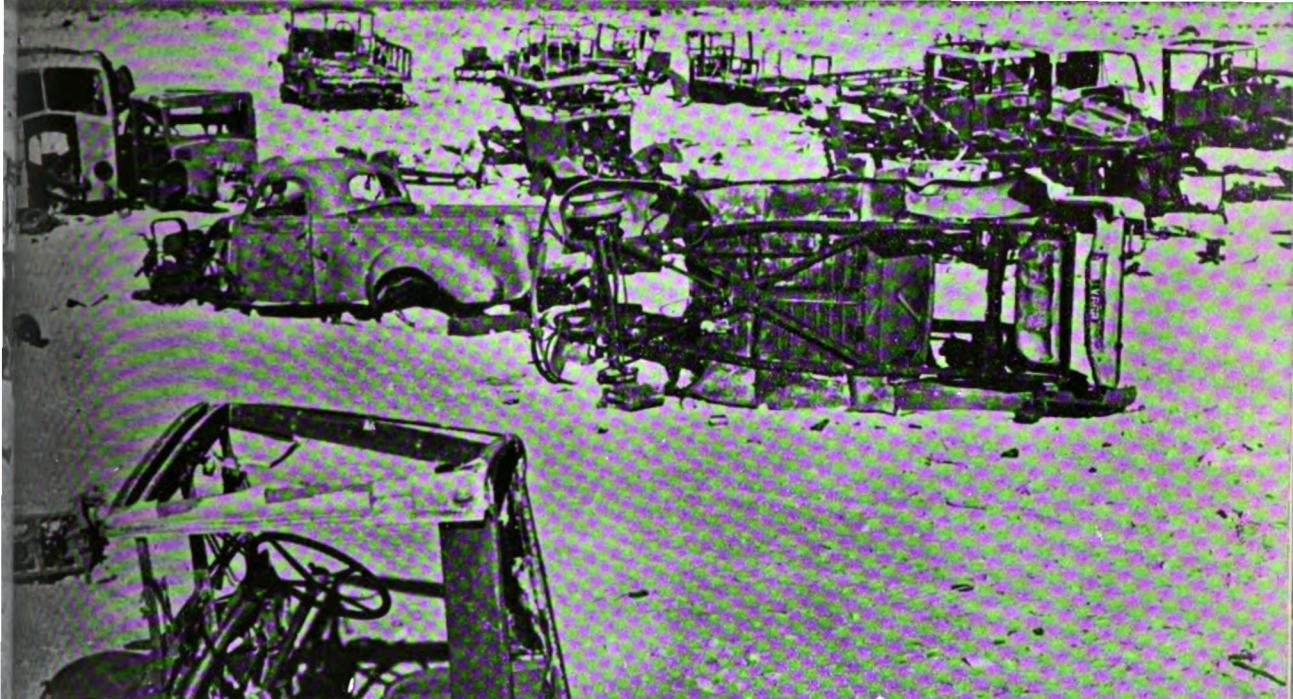
Continually the advance overtook small or large parties of the enemy, dumps of their abandoned weapons and stores, relics of their shattered transports. Sometimes it overtook our own pilots who, fighting ahead of everybody, had been shot down into the tail of Rommel's retreat.

Sergeant X, an Australian, was a fighter pilot of 21 years, taking part in this last great desert battle. In his Kittyhawk he formed part of an escort to a bombing raid of Bostons. They were jumped by a large number of Me.109s, two of which got on his tail. Cannon shells tore through his aircraft, wounding both his legs. The controls faded beneath his hands. He flung off his hood, started to jump and found himself

entangled in the oxygen tube. When he had struggled free, he barely had time to pull the ripcord of his parachute before reaching the ground. His waterbottle and emergency rations had been torn from his equipment as he extricated himself from the aircraft.

He was well south in the desert, but he refused to consider his case as hopeless. He ripped pieces from his parachute to bind the wounds in his legs. Then he tried to stand upright. He could not stand. This pilot now lay far out in the desert behind the enemy lines, entirely without food or water, unable to walk. His one thought was the knowledge that the British advance had begun. If he could last out, he decided, there was a chance that the advance would overtake and save him.

He did more than last out. Unable to walk, he started to crawl home across the desert. He found that by using his left foot and both arms he could propel himself, slowly and laboriously it is true, but in the right direction.



as a trail of blood and iron, and it marked the end of German military ambition in the Middle East.

He crawled for four days and four nights, with frequent periods of rest when his muscles could do no more. In the early hours of the morning he crawled from one clump of desert flowers to another, sucking from each a tiny drop of dew to relieve his thirst. Sometimes he lay motionless on the sand, watching large beetles scurrying towards him. When they were within reach he lunged out and caught them with his hands. He cut off their heads and ate their bodies. In that way he did something to assuage his hunger. It was not pleasant, he said, but he was desperate.

On the fourth day he reached an old Arab tomb, where he had to rest. It afforded a tiny, grateful shadow from the sun. By cunningly arranging a few stones in the form of a hollow, he collected "quite a fair amount of dew to drink." But he could go no farther. His mind started to wander. He thought he was back in his squadron mess with all his friends around him. He thought that aircraft landed in the

desert beside him and took off again without picking him up. By a great effort of control he banished these thoughts from his mind. But in his heart he had given up hope.

There in the shadow of the Arab tomb he was found on the fifth day by a British Bren-gun carrier out on patrol. He was still conscious, still able to thank his rescuers for the first drink of water he had taken in five days. They carried him back to hospital. He had lost four stone in weight. The palms of his hands were worn into sores where he had crawled across the desert, he was very weak. But he recovered and his health came back to him.

Like the other members of the Late Arrivals Club, he had beaten the desert. He could say truly that he had "succeeded in returning to his squadron, on foot or by other means, long after his Estimated Time of Arrival." It is never too late to come back.

Through dramas and heroism such as that the advance swept on. At night the medium

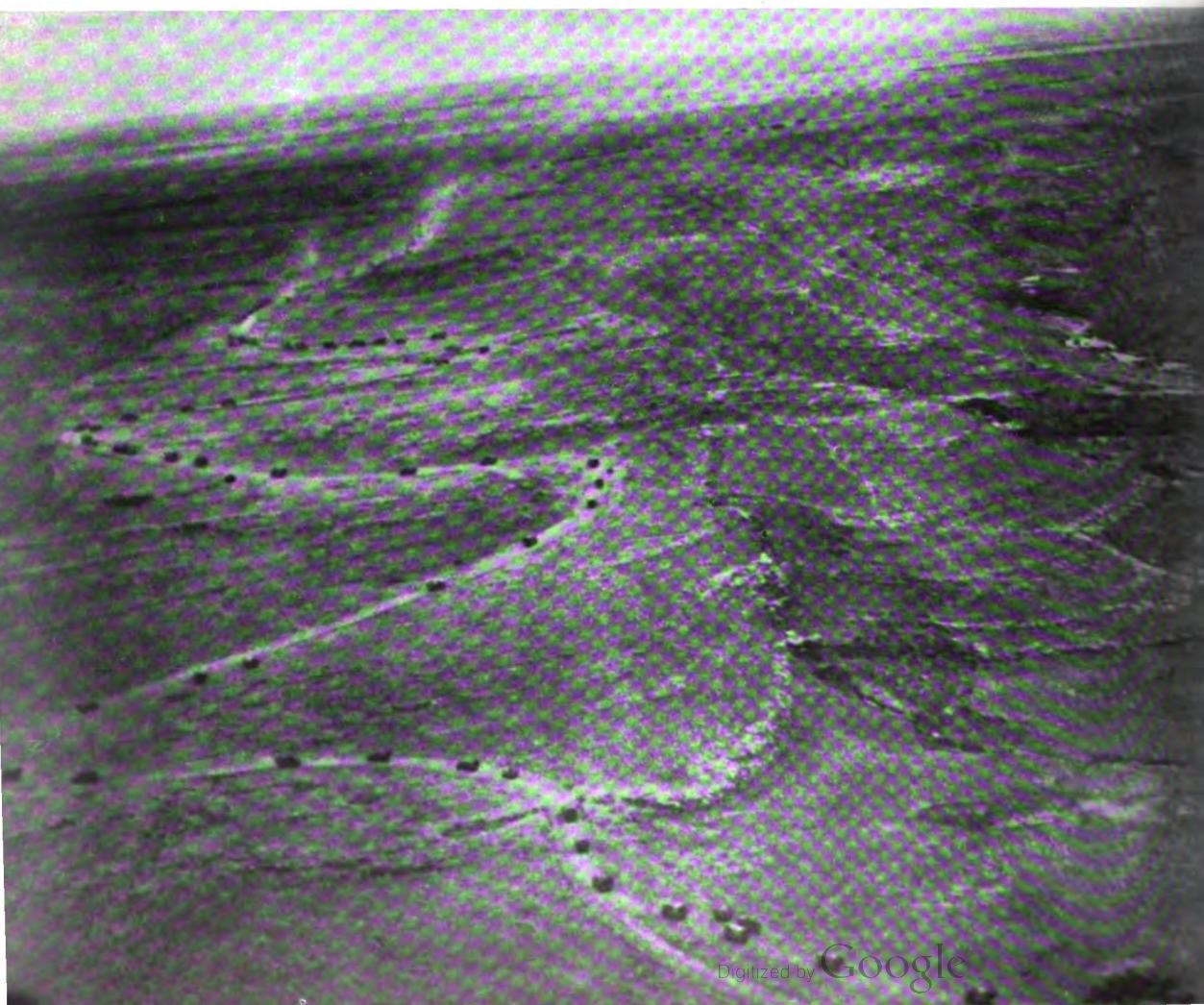
bombers, moving up into the desert more slowly behind the forward forces, continued to strike hard at the retreating army. On November 7th/8th they started more than 30 fires among the vehicles bunched at Sollum and Halfaya. Next day the fighter-bombers were at them, damaging 43 vehicles and a tank carrier in one attack alone. The following night the mediums and heavies were over Halfaya and Sollum again, starting some 50 fires.

In spite of the fact that the ground parties were leap-frogging forward every day, the bombers carried out double sorties each night, returning to the old base after the second sortie to pick up skeleton ground-crews and fly them forward to

the new. During the whole of this advance the bomber formations carried forward all the vast quantities of petrol which they needed; and for the first four days, during which they advanced their bases 200 miles, they also carried all their own bombs. The last hop of the journey which they made on the ground carried them forward another 270 miles right into Libya itself.

Still the enemy fled to the west and still the air forces pursued him, striking every day and every night at his columns. Each day the squadrons moved farther westwards, tumbling all their gear into lorries and getting out again on to the crowded coast road, which grew worse rather than better, for whole stretches of it had been prac-

Egypt is free. The Eighth Army climbs Halfaya Pass and crosses the frontier—a stream reaching as far as the eye can see. “This time we shall not come back.”



tically blasted away by bombs or washed out by floods. Tents were abandoned and the men stretched themselves to sleep on the ground behind whatever shelter a truck would provide. Bully-beef became not so much the staple as the only diet, a mug of hot tea a thing to be dreamt of. The pilots flying back from patrol settled in circles to talk wistfully of tenderly-cooked meals. One man had seen a sheep out in the blue; if they could catch that there would be delicacies indeed. They did not catch it, but there was always bully.

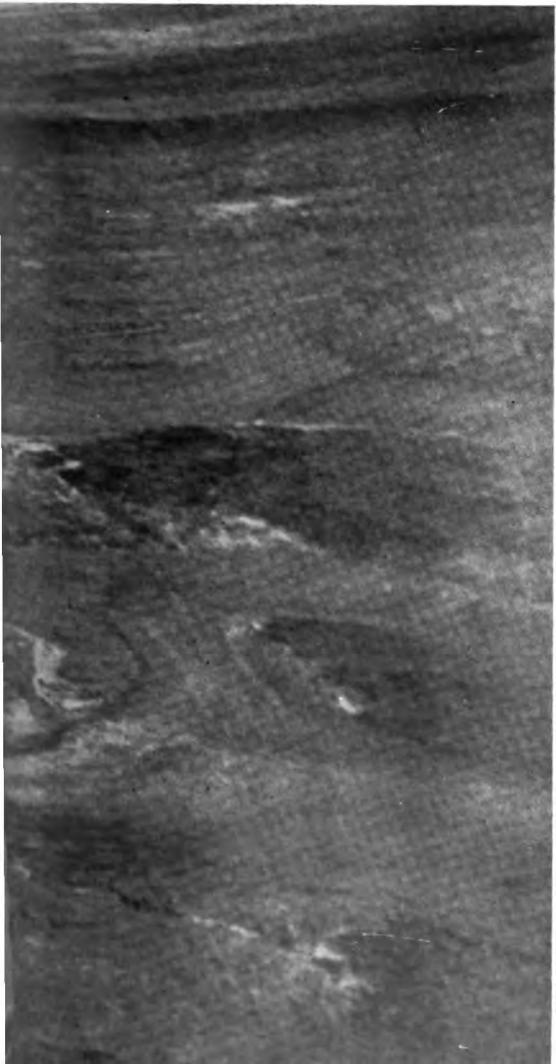
Nobody cared, for this was an advance. In spite of the congested road, the striking-force was advancing more swiftly than ever before, more

swiftly it seems than the Luftwaffe thought possible. For on November 11th, when the fighter squadrons had reached the big series of landing grounds south of Piccadilly—a point on the track crossing the desert where some nostalgic Englishman had built an "Eros" statue of petrol cans—the aircraft were flying forward far into Libya. The Luftwaffe chose that day to make its one big attempt to stop the advance of our armour, then over the border and moving against Sidi Azeiz.

The previous night the Luftwaffe had moved on to the Gambut landing grounds. Immediately at dawn the enemy put up their first bombing raid of 15 Stukas and six Messerschmitts. They clearly had not expected our fighters to be within range or the escort would have been much stronger. Kittyhawks on dawn patrol ran into the party and shot down eight Stukas, probably destroying four more. The remaining three fled with the Messerschmitts. As they approached Gambut to land, they found a squadron of Warhawks sitting over it which promptly shot down the remaining three Stukas. Not one German bomber got home from the first bombing raid. The Kittyhawks and Warhawks then came home to breakfast.

Encouraged by such a good start, they continued to shoot down enemy aircraft all day. By lunch-time they had shot down a further six Ju.52 transport aircraft, four Me.109s, a Ju.88 and a Fieseler Storch—a total for the day of 23 enemy aircraft certainly destroyed. After lunch the Luftwaffe gave it up and moved hastily back from Gambut. For the rest of the day our fighters strafed the packed coast road between Bardia and Tobruk.

Next day the advanced ground-parties of the squadrons, in a great convoy protected by armoured cars, swept across the frontier wire at Sheferzen into Libya again. As they came through, the trucks drew up, the drivers jumped out and cheered. A Hurricane flew over them and touched down on the landing ground at Sidi Azeiz. Its pilot was Group Captain Guy L. Carter, D.S.O., A.F.C., in command of the fighter force. In that same Hurricane he had been the last pilot to take off from Libya, when we were forced to withdraw the previous June. He had sworn then to be first in, with the same aircraft, when we advanced. He had to race one of his own squadrons to do it.



14—Graveyard of the Giants

THE SQUADRONS found Libya much as they had left it, except that there were a lot more shattered enemy aircraft on the airfields and except that Tobruk, already battered, was now a shell. The enemy yielded that fortress without a fight. There was no fight left for him. He could only run.

Kittyhawks that reached the place found the tail-end of his forces hurrying out of the harbour in barges, at least one of which they sank. But Gambut was the same. Nothing in this world will ever change Gambut. The dust lay as thick as ever, the tracks as deeply rutted. The three airfields on the point at Gazala were just the same when they reached them on November 15th. Those on top of the hills at Martuba were just as muddy the following day. Derna on the other hand was rather different, for the landing ground was so criss-crossed with mines as to be unusable for many days to come. Still, the Martubas sufficed, together with the Gazalas, for a highly important task which now had to be done. The siege of Malta had to be lifted.

On November 16th a convoy sailed from Alexandria carrying to Malta those very necessities which had been lacking, and impossible of delivery, while the enemy held Libya. It sailed under a fighter umbrella which was raised from every newly-won airfield along the whole coast as far as the area of Derna. It reached Malta almost without incident and without the loss of a ship. Air power took it there. It was so easy—once we held the right airfields.

That was only the first of many convoys to sail for Malta. Speedily the whole island was restocked. At once that invaluable island struck back with greater vigour than ever at the enemy to the north and to the south. As Rommel was driven westwards, his sea supply-routes travelled ever westwards ahead of him. By the night of November 13th/14th the Wellingtons were already in range of Benghazi and the "mail run" had started all over again. Very shortly the only entry port was Tripoli. The vantage point from which to strike it was then, not the mainland of Africa, but the island of Malta. Gradually,

as the advance went to the west, more and more bombers, torpedo carriers and long-range fighters were transferred to the island of Malta. Already when the first convoy steamed into Valetta they were at work.

Here the air power of the Middle East began to link up with wider operations which are outside the scope of this story: but something must be said of them, if only to show one theatre of war merging into another. Under the threat of the Allied armies marching through Algeria, the Germans had thrown a swift bridge-head into Tunisia, using mainly the big airfield of El Aouina outside Tunis. On November 10th this airfield was attacked for the first time by Beaufighters from Malta. They made landfall just before dusk some 30 miles to the south, flying the rest at "nought feet" over land, skimming over trees, houses and cafés.

"The people did not seem to have any fear of us," said Squadron Leader A. Watson, D.S.O., D.F.C., who led the formation; "there were plenty of lights showing and people sitting outside the cafés having drinks. Some of them did not even leave their chairs on the pavements but just steadied their drinks on the nearest table and stared up at us. When we got to El Aouina there must have been about 120 aircraft standing on the airfield, dispersed as best they could, but not much room for it. What a party! All of us got several of the aircraft on the ground. As I myself flew across I saw an enormous aircraft standing there—we found out afterwards it was one of the Merseburg 6-engine gliders. I was so fascinated by this damned big aircraft that I almost forgot to pull up over it in time. Then we had a quick look at the fires we had started and came home." In all they certainly destroyed 20 aircraft, including the Merseburg glider, damaging half a dozen more.

But that was only the start. From then onwards a revivified Malta turned to a fury of assault. El Aouina was raided by night and by day, its hangars knocked into twisted caricatures, its aircraft and workshops fired time after time. Farther to the east the Malta bombers attacked



They left the Luftwaffe behind them. On the landing grounds at Sollum, at Gambut, at Martuba, Derna, Benina, Magrun, Agedabia, El Agheila and through Tripoli to Castel Benito, lay the remains of a scattered and broken air force, abandoned in the haste and disorder of the retreat. This photograph was taken at Derna.

Tripoli, to the north they ranged over the air-fields and ports of Sicily and southern Italy.

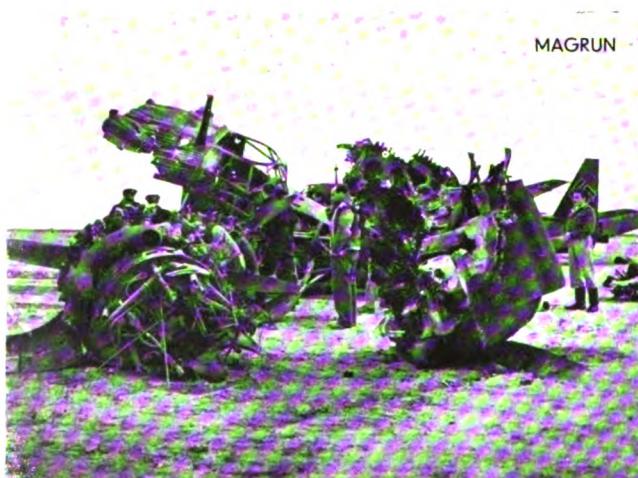
Beaufighters from Malta were particularly active in intercepting the air supply-route, which was attempting to pump at least a little petrol to Rommel or to carry in a few reinforcements. Seven of them, for instance, on November 12th found six S.82s, big Italian transport aircraft, crowded with troops. The Italians fled towards

their fortified island of Pantellaria, while the Beaufighters picked them off one by one. The last fell into the sea in flames just short of the island. Very soon the Beaufighters were shooting down troop and petrol carriers on this route practically every day. Once they destroyed what was believed to be the biggest aircraft yet shot down in the war, a B.V.222 flying-boat with six engines, which at first glance the Beaufighter pilot

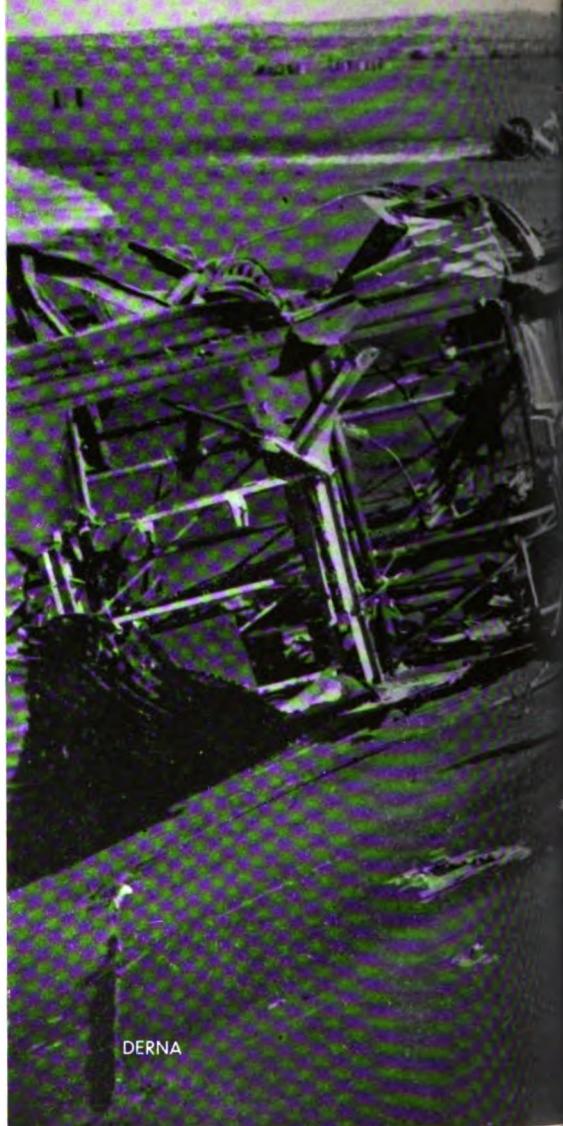


BENINA

The last battle of supplies. With the doors from the sea closed to him, Rommel sought to bring his vital supplies in the giant Ju. 52s. They were shot down into the sea and on the land, and Kittyhawks hung over the airfields day after day. When the Army came up they found Rommel's supply service a litter of burnt-out wrecks.



MAGRUN



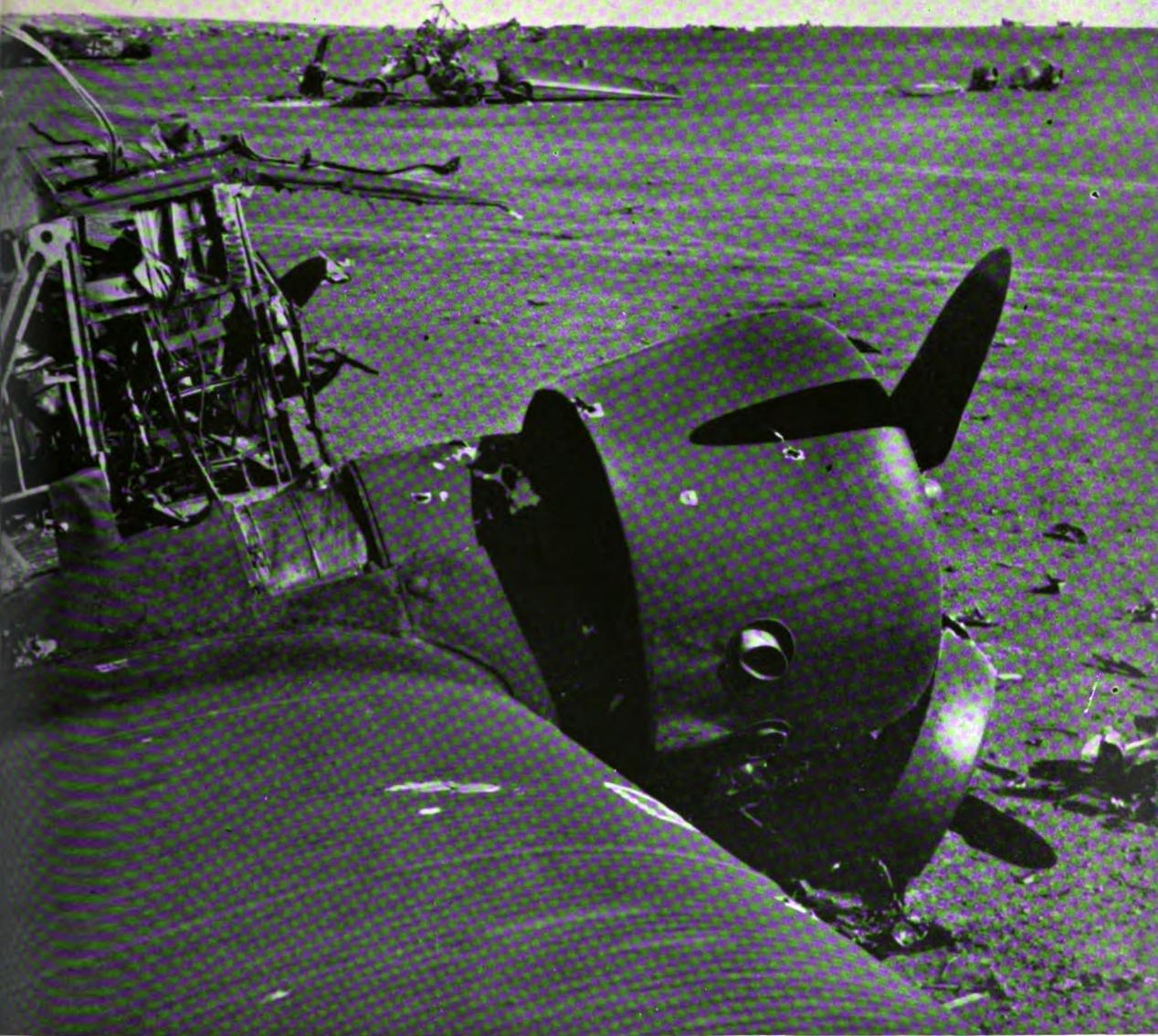
DERNA

took to be a ship of about 3,000 tons coming over the horizon.

During the month of November alone, the Beaufighters of Malta shot down 37 aircraft, mostly troop carriers, in air combat, and probably destroyed or damaged another 60. On the ground they knocked out or crippled 50 more. One of these squadrons was led by Wing Commander J. K. Buchanan, D.S.O., D.F.C., who was previously a bomber pilot.

in which capacity he had taken part in 230 bombing raids over 13 countries. When he went to Malta to take command of a long-range fighter squadron he had flown fighter aircraft for only 10 hours. In his first five fighter sorties he destroyed five enemy aircraft.

These attacks on the air supply-route were so seriously regarded by the enemy that he began to put big fighter umbrellas over his transport aircraft. Malta responded by flying Spitfires on



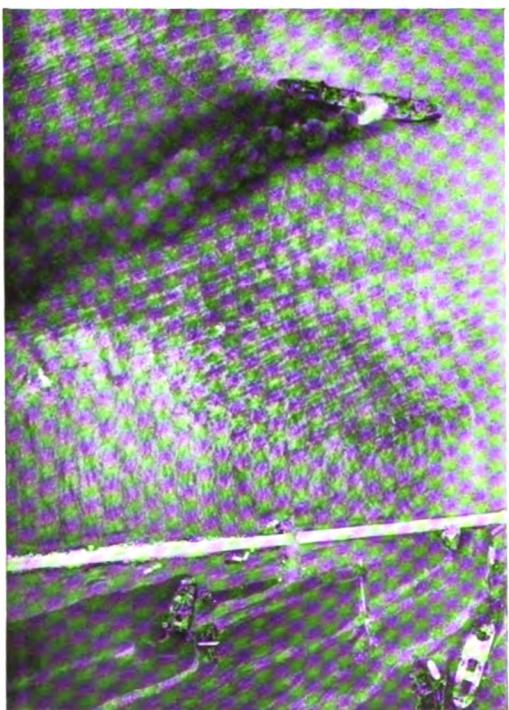
top of the Beaufighters and the result was the same. On December 11th such a formation met 32 Ju.52s, escorted by four twin-engine Me.110s and a Ju.88. The transport aircraft were flying only about 100 feet above the sea, south of Lampedusa island, with their escort some 500 feet above them. The Spitfires went for the escort, shooting it all down. Three of the Messerschmitts fell into the sea in swift balls of flame, the fourth floated on like a parachute flare and

then dropped. The Ju.88 spun into the sea. Then the Spitfire leader was heard calling over his radio, "Let's go for the big stuff." They dived on the Ju.52s, and shot down two of them; the Beaufighters came in afterwards and shot down six more.

Back on the African mainland the Wellingtons by night and the American Liberators by dusk were taking their last opportunity to pound Benghazi before it fell into our hands. They hit

hard. One tanker which lay near the entrance to the harbour was split into two parts, both on fire. She burnt for many days after the 8th Army had reached Benghazi, a crackling of flames on the waterline, a tall pillar of smoke by day, a glow by night. When she had at last burnt herself out it was as though a familiar landmark had been removed.

In the desert the squadrons were still pushing forward. The fighters were concentrating towards the end of November on the petrol war. Forbidden entrance by sea, the Germans were striving to bring at least a little petrol into Cyrenaica by air in order to pull what tanks and trucks remained to them round the corner at Agheila. The two airfields which they chose as the southern termini were the big station at Benina just outside Benghazi and a flat desert landing ground at Magrun some 50 miles farther south down the coast road.



Benghazi, bombed to hell and deserted, was entered on November 21st. The R.A.F. watched a tanker, fired in a raid on November 6th, burn herself out. Harry, Johnny and the rest lay where they had put them, derelict.

Reconnaissance photographs showed more and more big transport aircraft using these airfields, so the Kittyhawks hung over them day after day. They made some good hauls. On November 17th, they found 13 Ju.52s and He.111s at Benina, shooting down six of them from the air and destroying all the rest on the ground. One Junkers was shot down on to a Benina hangar, setting the whole thing ablaze. Next day the Kittyhawks around Benina and Magrun shot down eight more Ju.52s in air combat, and destroyed or damaged 27 more aircraft, most of them transports, on the ground. Magrun, indeed, was the graveyard of the giants. Burnt-out wrecks of big aircraft which had obviously been carrying petrol littered the whole place.

On November 21st our forces entered Benghazi, a city bombed to hell, deserted by all save a few Arabs who wandered among the ruins and watched the British take over. The desert force of fighters and fighter-bombers had moved southwest across the desert on the old route, Msus, Antelat, Agedabia, Hasseiat. Some of the landing grounds were flooded, but others were available. Thus, at the beginning of December, the forces began to prepare themselves to turn the enemy out of the traditional stronghold of Agheila. There was a necessary pause during which we accumulated strength. One or two eyes looked a little warily at the gateway to Tripolitania. We had been here before—twice.

During the pause is an apt moment to tell something of a formation of desert fighters that had fought a most successful little campaign of its own, far from the main battle. It was carried by air to a secret landing ground in the heart of the desert, behind the enemy lines. Somewhere in the north Rommel's army was retreating; this little arm of air power intended to strike him in the face as he ran. By dawn next day Hurricanes appeared far behind the front lines, strafing the roads, then wheeling back south into the desert to be lost in its immensity. While the Germans were still on the eastern borders of Cyrenaica, these Hurricanes were close enough to strike at their road columns on the western border, around Agheila itself.

They were also beautifully placed to cut off a somewhat contemptible force of the Italian army. When the Germans advanced during the summer as far as Alamein, our small forces that had occupied the oasis of Siwa had been compelled to withdraw to avoid being cut off. Siwa

was then occupied, to a great flourish on the Rome radio, but without any fighting at all, by a detachment of the Fascisti Youth, a party organisation of young blackshirts.

They remained at Siwa throughout the summer, constantly lauded by propaganda for the courage with which they supported life in this very pleasant oasis. When the Axis was thrown back from Alamein they were too far away for the Germans to confiscate their transport, so they hastily packed up and drove off to the east. That was where the Hurricanes caught them.

They found them in the open desert and flew out to strafe them time and again, until not a lorry would run, and until it was doubtful whether a single young blackshirt would ever again reach safety.

Then they turned back on to the German columns on the Agheila road. By the time the enemy had been driven out of Cyrenaica altogether, this small detachment of Hurricanes working from the heart of the desert had destroyed 130 enemy vehicles and damaged a further 171.

15—"It isn't desert any more"

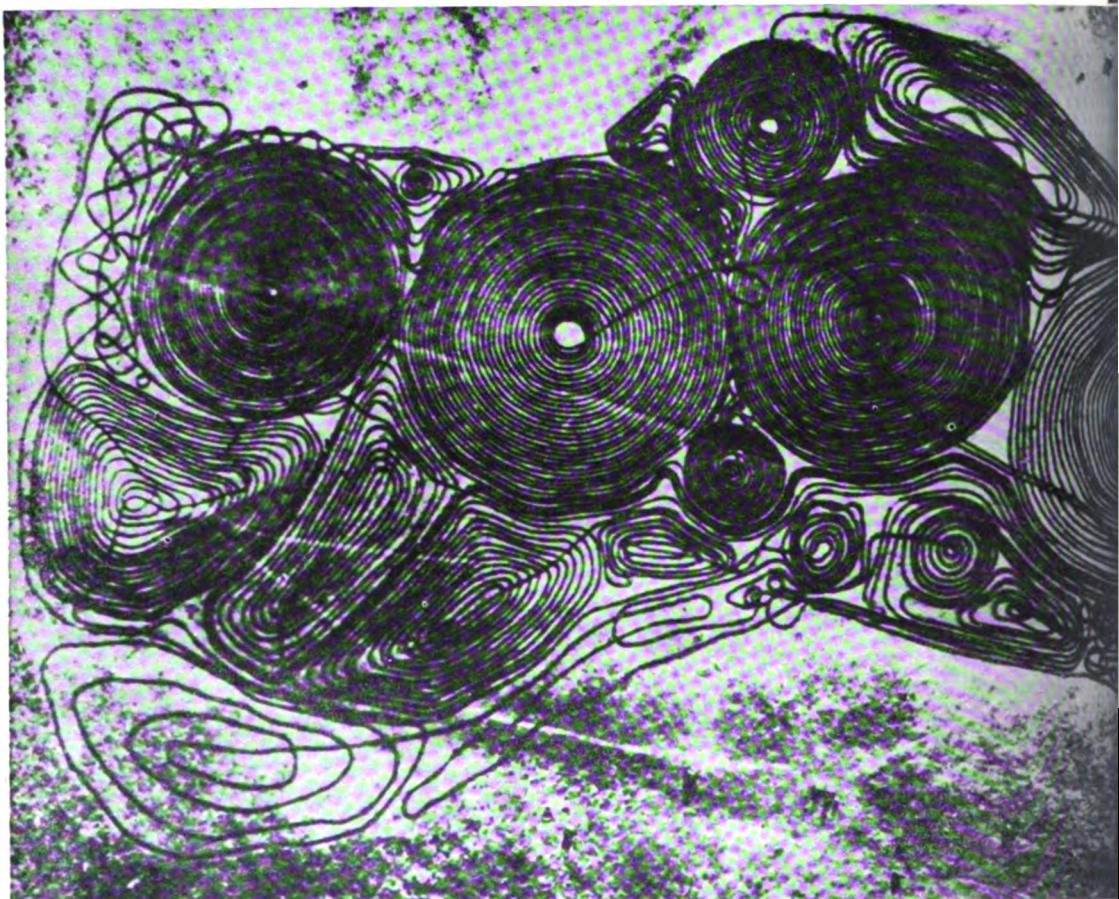
EARLY IN DECEMBER the war in the desert seemed almost static. The attention of the world was directed towards the mighty strides made by the Russians, and to the fortunes of the Allied forces attacking Tunisia from the west. But on December 13th the desert was suddenly news again; the desert forces were on the move. Although he had not been seriously attacked, Rommel was pulling out of the stronghold of Agheila, retreating towards Marble Arch, the big desert landing ground on the coast marked by a great Italian triumphal arch across the road.

In a few hours the British would be round the Agheila corner, that obstacle of two years; in a few hours they would be in Tripolitania for the first time; it began to look as though in a few weeks the last province of her African empire would be lost to Italy.

It was a day of crisis in the land war, so the desert air forces responded in their traditional way. They set up a new record of fighter-bomber sorties. Every aircraft that could fly was turned on to the retreating enemy columns between Agheila and Marble Arch. In the very first attack petrol bowsers were set on fire, and here and there the road was blocked by burning transport. Before breakfast the scene was dotted with thin columns of smoke rising straight into the sky. Contemptuous of interference by the Luftwaffe, which was quite strongly established on Marble Arch landing ground itself, the



Marble Arch, gateway to Tripoli. Harried by fighter-bombers and night-flying Hurricanes, the enemy left the airfield on December 15th. By December 18th, the R.A.F. were installed and operating—their first entirely airborne move of a complete wing.

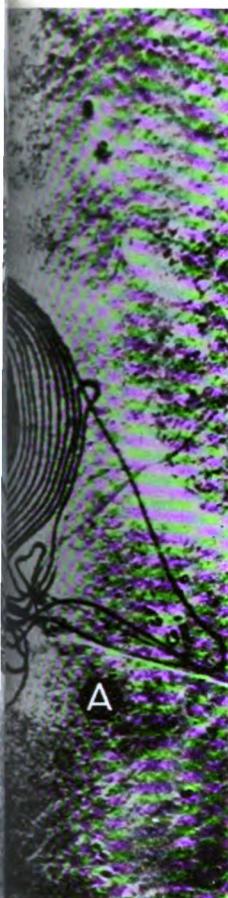


Kittyhawks shot down six of the few Messerschmitts which took off to intervene. All day long, Spitfires swept up and down the road, their guns firing from the height of the telegraph wires.

That night Hurricanes trained in night flying took over. The pilots flew as many as three sorties in each aircraft every night thereafter, coming back twice to base to refuel, rearm and take off again. Next day, by a stern effort of supply, some of the light bombers were brought into range to add their weight to the attack round Marble Arch. It was enough; the enemy did not stay. By December 16th, the bombing targets had retreated as far west as Nofilia.

The rearguard had not escaped from Marble Arch unscathed. During the preceding days a considerable force of the 8th Army had made a wide detour south and west through extremely difficult desert, striking back north at the road to trap some of Rommel's men. With that force went a small party of ground staff of the R.A.F. Together with the Royal Engineers they worked laboriously at Marble Arch, clearing of mines enough space to enable the aircraft to land and enough round the edges for some sort of dispersal. Then they signalled to the squadrons to come on.

That was the point at which the desert air forces carried out their first entirely airborne move of a complete wing. The whole equipment



A

"The enemy tried every sort of dodge to slow up the fighter squadrons which bombed and strafed him by day and by night. Hundreds of thousands of land mines were scattered on and around the landing grounds. Men took ploughs and ploughed the airfield surfaces into the most fantastic patterns." The laborious design of this photograph was cut into the red soil by three tractor-drawn ploughs, all starting from A. Half-way through, the large circles and three smaller circles completed, they broke off for lunch. . . .

It availed him not at all; the R.A.F. simply made new airfields. Every man of all ranks got down to it. They cut out the scrub to burn it, they shifted the boulders, they dug out the soft patches and filled them with hard core. In a day and a half the job was done.

and personnel of one fighter-bomber wing were loaded into a fleet of transport aircraft at dawn on December 18th. The fighter-bombers themselves flew alongside the transports carrying their bombs, petrol, ground staff and gear. They all touched down on Marble Arch.

Everybody then set to work to off-load and to prepare the fighter-bombers for combat. Pilots helped carry their own bombs and fix them on the aircraft. In less than two hours the first squadrons had taken off to bomb the enemy on the road to Sirte. They were taken completely by surprise. It had been thought, doubtless, that Marble Arch was so mined as to prevent its use for a week or more. In fact the fighter-bombers were

using it less than 48 hours after the last German drove away. That sudden move enabled them to bomb as far to the west as Buerat-el-Hsun.

That was the pattern and the speed of the rest of this great advance of the squadrons. It was in a sense a race, not to get to Tripoli, but to get sufficiently far forward on the ground to be able to strike the German columns from the air no matter how fast they ran. The enemy tried every sort of dodge to slow up these fighter squadrons which bombed and strafed him by day and by night. Hundreds of thousands of land mines were scattered on and around the landing grounds. Men took ploughs and ploughed the airfield surfaces into the most fantastic patterns,

so that they looked from the air like surrealist etchings or balls of tangled wool.

They succeeded, indeed, in making the existing landing grounds unfit for immediate use, but not in stopping the R.A.F., which simply made new airfields. All the time ground parties pushed ahead in small convoys led by the R.A.F. armoured cars, tracking over the desert by compass bearing to choose flat and likely places for new landing grounds.

A party arrived at one such selected place late on Christmas Eve. It was a wide, featureless stretch of desert, some of it soft sand, covered here with patches of scrub, littered there with boulders. Work started at dawn on Christmas Day, every man of all ranks taking off his tunic and getting down to it with a shovel. They cut out the scrub to burn it, they shifted the boulders, they dug out the soft patches and filled them with hard core. Lorries in line abreast were driven across the site to help flatten it. Loose boards were hitched behind the lorries like sleds and dragged over the bumpy places with a few men sitting on them to increase the weight of the "roller." They had no Christmas dinner, but just bully brought out to them as they worked. By the afternoon of Boxing Day the job was done. A new landing ground stood in the desert to await the squadrons. As the first aircraft came in to land, soon afterwards to take off again and bomb the enemy, one of the aircrafthands was heard to remark that it was the most satisfactory Christmas he had ever spent.

It was similar work by the ground parties that finally put the squadrons within range of Tripoli itself. Once again the existing landing grounds had been mined round the edges and ploughed in the centre. But the squadrons did catch one ploughing party at work on Castel Benito airfield near Tripoli. After the party was over, they sang a new jingle to an old tune that night:

"Six men came to plough, to plough Castel Benito,
Six men, five men, four men, three men, two
men, one man, no men with no plough,
Work now finito."

However, the airfields could not be used, and new ones had to be created. The ground party travelled forward through the night, reaching the agreed sites before breakfast. The squadron leader in command sent back a message that he

would have a landing ground ready for the squadrons in three hours' time. He kept his promise. By nightfall the ground party had created a second airfield a few miles away. They worked all night and by the following dawn they had created a third. The Luftwaffe was welcome to plough up and mine its airfields as it fled; the engineers and the R.A.F. in the desert created new airfields from nothing at the rate of three in 24 hours.

Airfields in themselves are not everything, however. There is still the need for supplies. That problem was tackled by the fleet of transport aircraft of the R.A.F., the U.S.A.A.F., and the British Overseas Airways Corporation. Almost all the big and suitable aircraft in Africa were brought into the organisation, which played a vital part in the advance, not only of air but also of ground parties. From the start at Alamein the transports flew forward petrol, water, bombs, ammunition and a variety of other stores. One pilot worked out, from what figures is a little uncertain, that the water he was drinking on a landing ground in Tripolitania was costing 10d. a glass to reach him—more than beer; thereafter he drank the stuff with greater reverence. Without the air-transport organisation there would have been no water at all. Without it, in fact, the advance would have been impossible.

It would have been much more difficult, too, without the work of aircraft over the Mediterranean blasting continually at the enemy supply lines. Night after night the Wellingtons bombed the ports of Sicily, southern Italy, Tripoli, Tunisia. The torpedo Wellingtons and the naval Albacores were still roaming the night sky over the sea, searching out the enemy supply-ships and sinking them in sheets of flame. The strength of these attacks on the supply lines was increased as Rommel's need became the more desperate. In the seven weeks from November 1st, at least 45 ships were sunk or very severely damaged by bomb or air torpedo. Nearly half of that total was hit at sea; the rest in port at one end or other of the supply route.

* * * *

At 5 o'clock on the morning of January 23rd, 1943, just three months to a day since the 8th Army joined battle at Alamein, the first British troops entered Tripoli. At the same time the advance parties of the squadrons took over

Castel Benito airfield outside the city. The first officer to arrive duly signed his name in the Italian visitors' book in the watch tower. The Italian Empire was ended.

Through an advance of 1,400 miles over the desert, carrying every necessity of life and war with them, the squadrons never once fell out of range of the front line. Over a distance roughly equal to that between Moscow and Berlin they struck the enemy every day and every night. A squadron of aircraft, with all the cumbersome paraphernalia of petrol, bombs, machinery, signals, does not move as easily as a squadron of tanks or armoured cars; but the desert squadrons never once fell behind, nor out of mechanical efficiency. The aircraft flew as well on the last day as the first. The trucks rattled and squeaked, but they still ran. The men, clothes and bodies alike, were stained with the desert dust, but of a grand spirit.

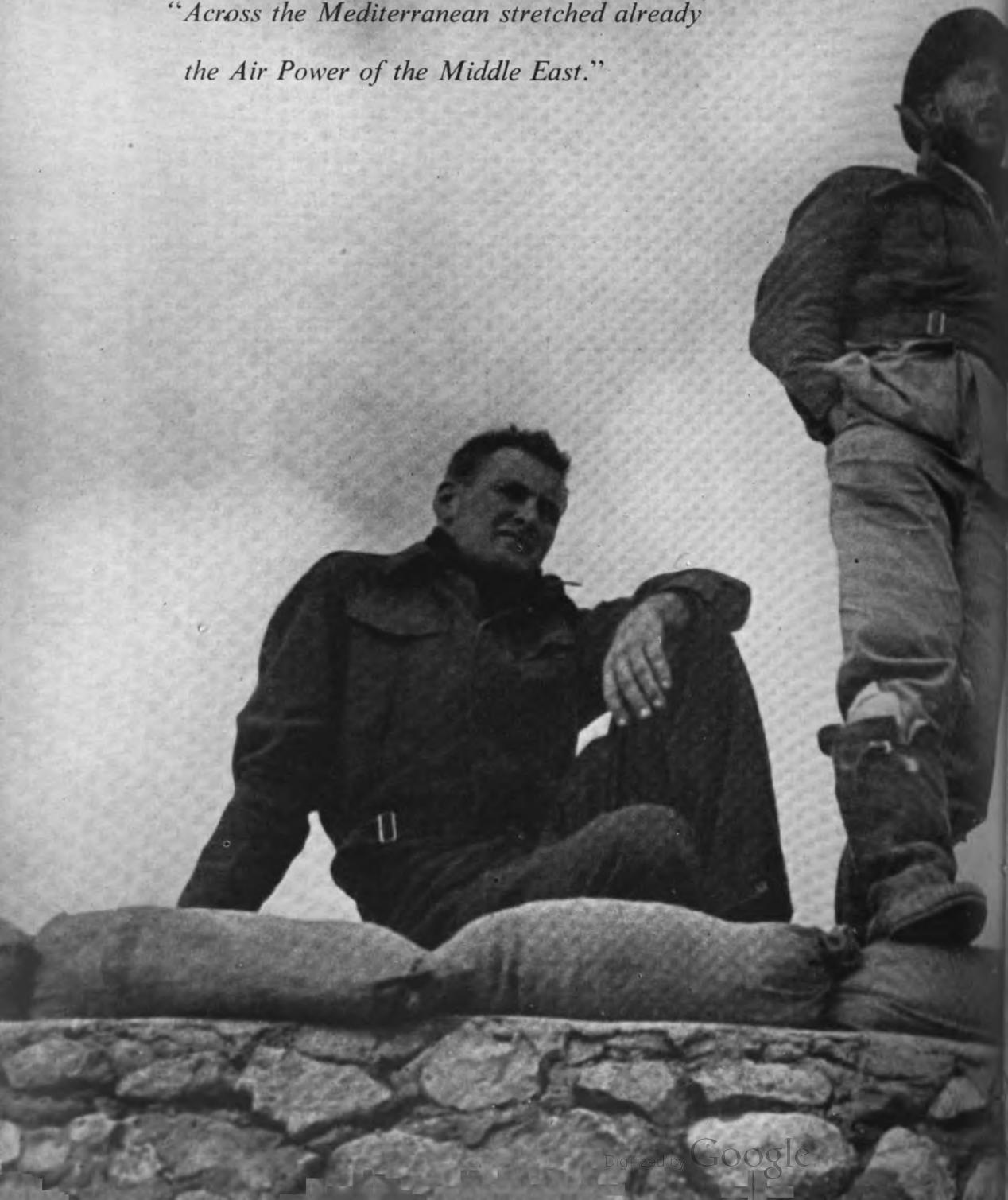
They made Tripoli. It has been called the greatest single advance in military history. It ensured that, in any foreseeable circumstances, the Western Desert war was at last ended. The headquarters of the desert fighter force set up its tents outside Tripoli in an orchard. "Heaven knows what grows in the orchard," said one of

the officers, "but it's green, it's an orchard—it isn't desert any more."

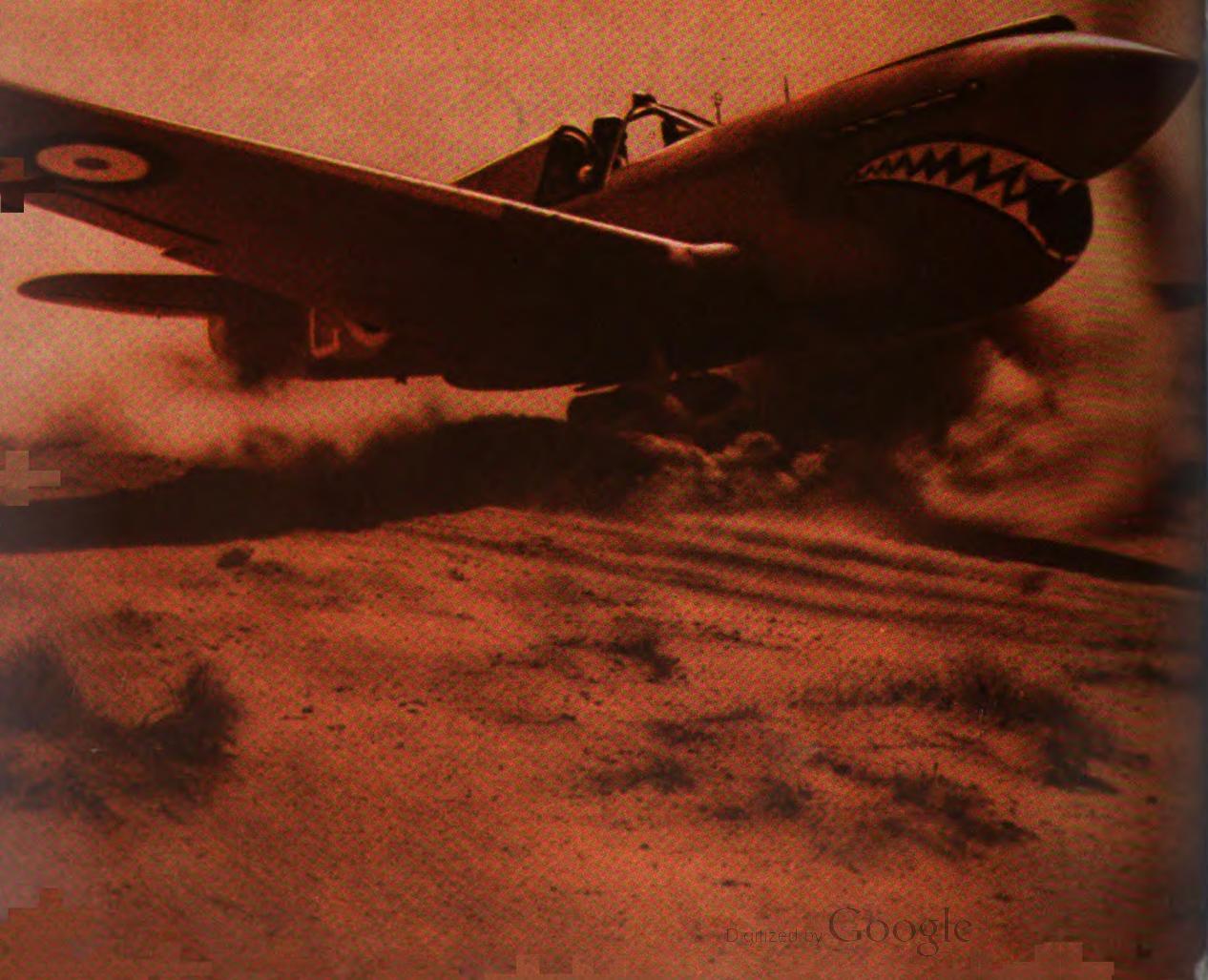
What lay ahead of them the squadrons did not know. Great things obviously, for already Mr. Winston Churchill and President Franklin Roosevelt had met at Casablanca. Across the Mediterranean stretched already that air power of the Middle East, already proven, coiling for greater blows with greater strength. All that lay in the future. For the present the squadrons knew only that the Western Desert war was ended. There was some more desert to be crossed, it is true, as they proceeded west into Tunisia, but for the moment they lived in an oasis; that great expanse of the Western Desert in which they had fought for so long lay behind, the country of green mountains ahead. Yet perhaps one or two eyes turned a little regretfully back to the barren territories, one or two pictures presented themselves—a dispersal of tents, the almost warm brightness of the moon, the sound of a violin humming across the sand, men's voices singing; the reminiscent flavour of bully-beef and hot tea, and at dawn the sudden roar of engines warming up, the kicked-back wakes of sand from spinning airscrews, the lift and climb into the desert air.



*“Across the Mediterranean stretched already
the Air Power of the Middle East.”*







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SEA-WAR

MAR. 1943



WHAT *is sea-power?*

HOW *does it work?*

WHERE *can it operate?*

WHEN *can it force a decision?*

WHY *do the Allied Nations rely on it?*

WHICH *is decisive—sea-power or air-power?*

SEA-WAR

An explanation of sea-power at work

NOVEMBER 1943

G.P. 39/274/1

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WHAT *is sea-power?* How does it work? Where can it operate? When can it force a decision? Why do the Allied Nations rely upon it? Which is *decisive*—sea-power or air-power?

THE ANSWERS to these questions, and to many others arising from them, are not easy to give. Yet such questions are being asked hundreds of times a day, not only in neutral countries, but in Britain and America, in China and the Soviet Union, in all parts of the British Commonwealth and throughout the Allied Nations.

THESE QUESTIONS are not *easily* answered, only because proper answers to them demand, on the part of the questioner, an understanding of certain broad facts. Facts about war, and about geography, and about ships and navies, and even about the way in which the ordinary *peace-time* world carries on its day-to-day affairs. . . .

THIS BOOK gives those facts, simply and clearly, and answers those questions in an understandable way, by presenting the simple truths about sea-war.

The facts and information on which this book is based are those which, under the stress of war, it is permitted to divulge. The full account of the sea-war, in all its massive and inspiring detail, must await the victory which sea-power is helping to enforce. It will be found to enhance the validity of sea-power's claim to play the decisive role in modern war.

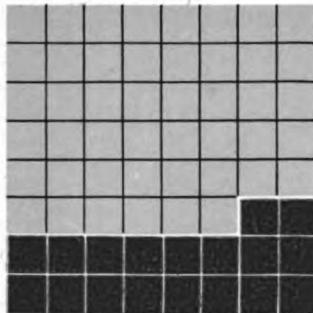
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I. THE WATERY PLANET—EARTH

The world is mainly salt water

EARTH is a globe. We think of it, almost always, as a solid globe. When we are told, at school, that the world is a sphere, slightly flattened at its poles, we think of it as a solid sphere, made of rock and soil and sand, carrying mountain ranges, deserts, plains, forests, fields, rivers, cities, towns and villages—and



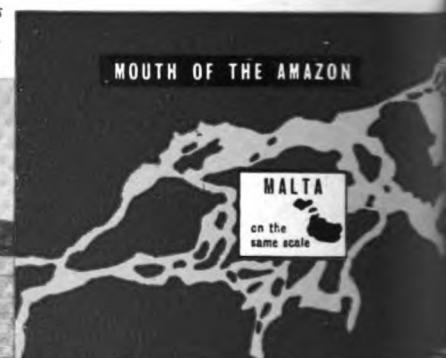
If all the earth's surface is represented by a chessboard, then the proportion that is land would be as shown by the dark squares in the plan above—all the rest would be salt water.

the multitudes of animals, birds, insects and men. For this is Earth as we see and know it. The picture is easy to make and carry in our heads.

But it is not a true picture. For almost all the surface of the earth is salt water. Seas and oceans cover 141 millions of square miles, out of a total of 196 millions. If the total surface of the earth is represented by a chessboard, then 46 of the 64 squares would be water, and the rest land, including all the rivers and lakes.

On some of those rivers a man might sail for many days without sighting the shores—the banks would be fifty miles or more apart; on some of those lakes his ship might be wrecked and no trace of it ever be seen again—the shores might be more than a hundred miles apart. Such a man might well believe that most of the known world was water—yet all the rivers and lakes in the world are contained in the small proportion of the earth that is land. Thinking of this, it is possible to get some impression of the vastness of the remote expanses of the sea.

A view of the River Amazon, at a point hundreds of miles from the sea. The great area of the river's estuary is strikingly illustrated by the inset map of the famous Mediterranean island of Malta, which has been superimposed for comparison.



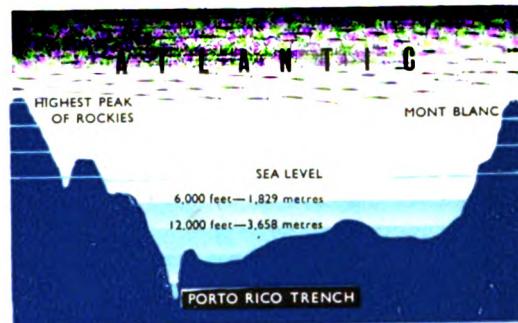
The world, as we know it to be to-day, is "kept together" by communication across the seas. The huge areas of salt water, which cover three-quarters of the globe, which separate the land-masses that are continents and divide the world, are no longer trackless wastes. The progress of man from his earliest beginnings has been marked by increasing communications. As communications have developed between tribe and tribe, town and town, nation and nation, continent and continent, mankind has advanced, trading and warring alternately. As jungle trails linked villages, so roads linked towns, as caravan routes linked nations, so ocean highways linked the continents. We often speak of these days, the days of motor-cars, railways, radio, steamships and aircraft (all of which have appeared within little more than the last hundred years) as the Age of Communications.

Both war and trade in the past were on a smaller scale. The growth of communications made war and trade grow greater in their scope. To-day's Age of Communications has brought the last, most gigantic war of all time. It involves the whole world. By involving the whole world, it involves 141 millions of square miles of seas, the watery wastes which link the world's islands of land.

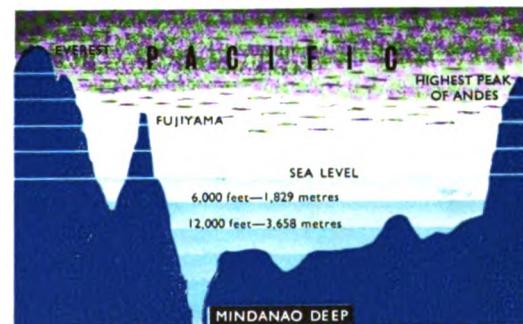
Wars have involved the world's seas ever since those seas became charted and routed, ever since the busy traffic of the trading ships began to course from main to main. But the world as we know it, each part trading with another, now *depends upon world sea-routes for its very existence*. No longer—as in the days of Drake, Frobisher and Hawkins; Diego Valdez, Cortez and Magellan; Columbus and Cabot, Blake, Collingwood and Nelson—no longer do sea-routes merely bring *extra* wealth and luxuries which if cut off leave warring nations little the worse. To-day, the food, the industries and the internal transport

of many States depend absolutely on the world's sea-routes.

World war, in this view of the world as made up of relatively small land-masses, *inter-dependent*, and linked by immense tracts of ocean, will necessarily involve the three-quarters of the world that is sea as much as it involves the one-quarter that is land. And *sea-power* thus assumes to-day a vital place in the balance of power between belligerent States or groups of States; from an important role (in the days of Elizabeth of England and Philip II of Spain) to a dominant role (in the days of Blake and Van Tromp, Nelson and Napoleon) sea-power has risen in status to play the decisive master role in modern world conflict.



The vast deeps of the oceans which separate the main land masses of the globe are indicated in these two section views.



The Pacific Ocean in section, showing incidentally that Japan's insular position separates her by great distances and great depths both from her new conquests and from her enemies.

The North and South Atlantic Oceans, bounded by the land-masses of EUROPE and AFRICA on the east, and of NORTH and SOUTH AMERICA on the west . . . an immense area of ocean across the surface of which the major part of all goods and supplies exchanged between the Old and New Worlds must be carried in ships.



The Pacific Ocean's watery domain, between ASIA, AMERICA and AUSTRALASIA . . . millions of square miles of salt-water, with infrequent and tiny islands chiefly upon its south-western fringes—an ocean-space upon which Japan relied to protect her from American attack, but which is gradually brought under Allied control by the establishment of land-bases in Australia and by Allied sea-and-air-power's steady encroachment, island by island, towards Japan.



II. CONTROL OF THE SALT WATER

Sea-power means control over sea-communications

SEA-POWER is simply defined. It is the control of the world's sea-routes. Such a definition, however, raises at once several questions. What is such control? How is it exercised? By whom?

Control over sea-routes is the ability to protect friendly shipping sailing along them and to deny a passage to unfriendly shipping. It follows that those who wield such control can make full use of the trade and resources of the world in so far as they depend on overseas transit, and cut off an enemy from all share in them.

That control is exercised by the possession of the ports, harbours, fuelling stations and estuaries from which ships set out and to which they repair for supplies and return with their cargoes.

Those nations which exercise such control are the nations owning or having access to these necessary facilities, and able also to send forth from them the vessels of war which will protect friendly shipping from attack, and sink or capture the enemy's shipping. These are the three fundamentals of sea-power. It is by control of sea-routes that sea-power takes effect. It is by possession of or access to sea-bases that that control is exercised. It is through the operation of navies from those bases that the exercise of that control is implemented.

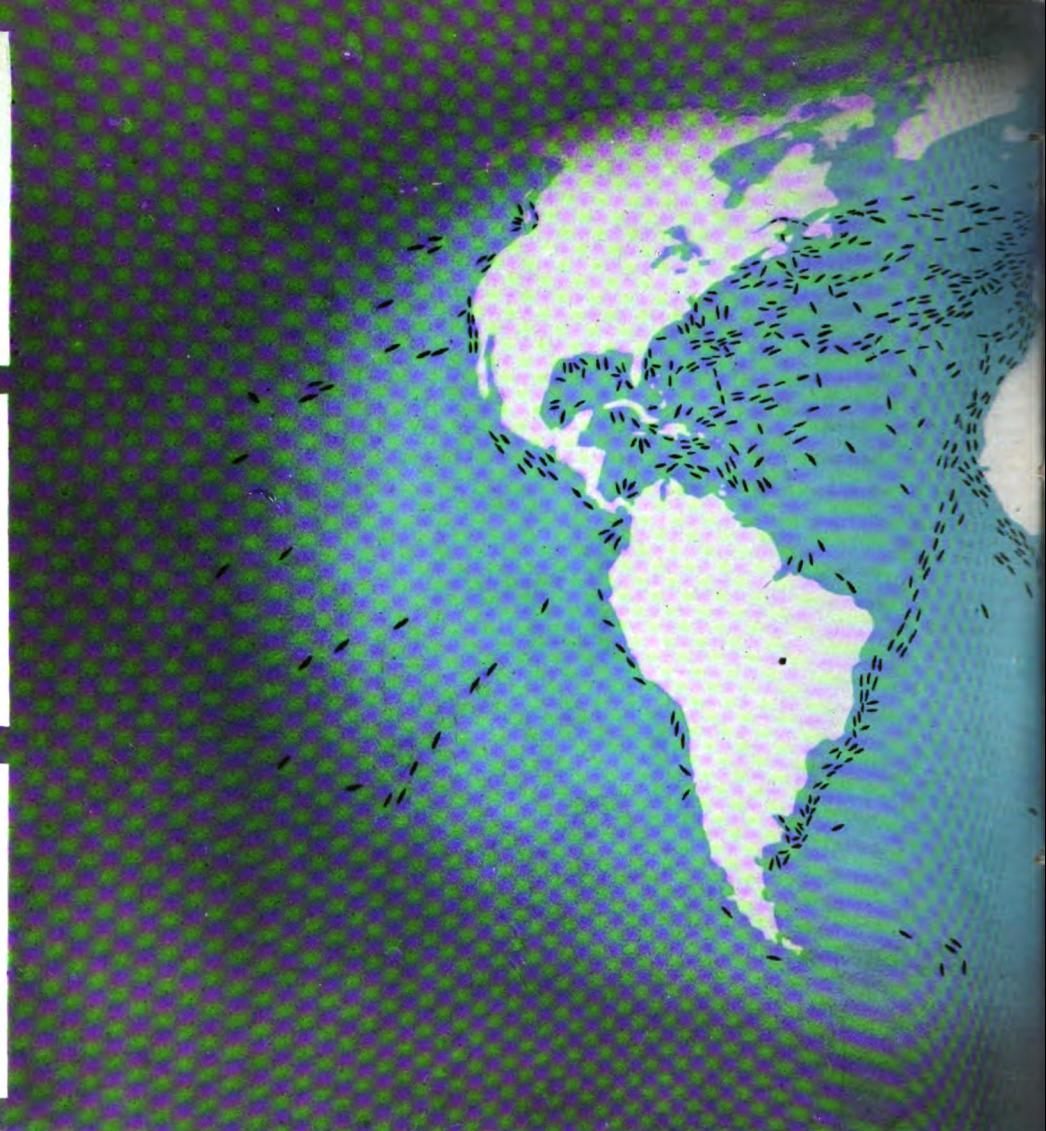
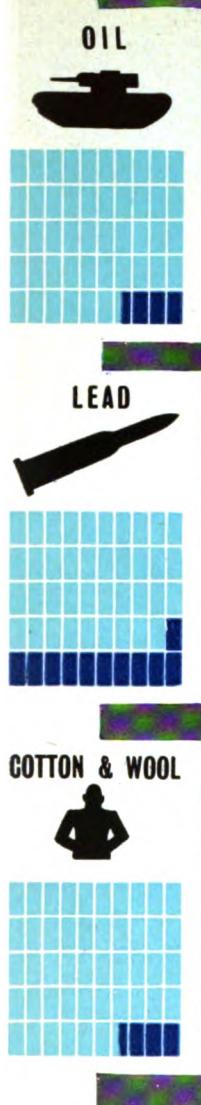
The enemy, however, will attack this situation by every means possible to him. From bases

in his possession or bases which his military action enables him to secure, he will send out fleets of war vessels to dispute the seas with the war vessels of his opponent. Each side, therefore, in modern wars, has endeavoured to create a more powerful fleet than that of the other, and the logical outcome of this process during many decades of modern naval history has been the *capital ships*—the battleships and battle-cruisers—which have developed as the most powerful units of the war fleet.

The major function of the battle-fleets, centred upon the battleships, is that of meeting and beating the naval forces of the enemy. In Nelson's Navy, the Line of Battle was formed from the most powerfully gunned ships in the rival fleets; the Line of Battle ships, from which the name battleship is derived, fought out the final issue, gun against gun, bulwark to bulwark and, at the end, man to man. That done, and a sea victory accomplished, the defeated side had no ships afloat capable of disputing the real mastery of the seas with the victor; forays, raids and sallies might be made as opportunity offered, but the appearance upon the horizon of the topmasts of a ship of the line ended all such adventures; lighter and more lightly armed craft must use their speed and power of manœuvre to effect escape if they could; the watery highways were free to the victor's shipping and denied to that of the vanquished.

In essentials, it remains true to-day that

(Continued on page 10)



THE WATERY PLANET

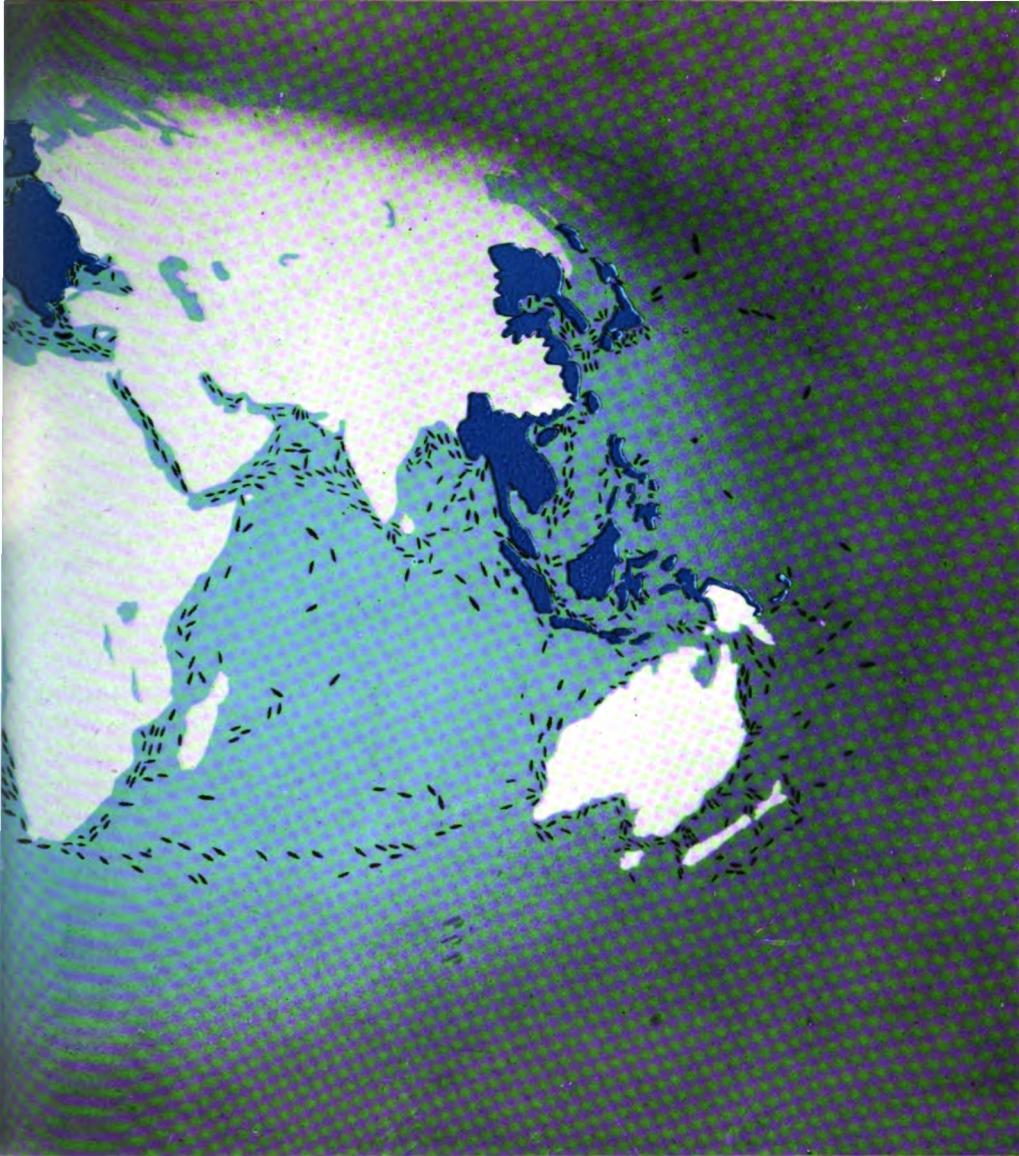
on a "Homolographic" projection.

This map of the world, by distorting the circle (which represents the plane view of the globe) into an ellipse, gives a truer view of the relation of the land-masses than does the more familiar "flat" projection of Mercator. The edges of the ellipse are softened, to make allowance not only for the east-west and north-south curvature, but also for the fact that the extremes of the ellipse are not exact margins: the westernmost tip of the American continent and the easternmost tip of Asia actually meet at the Behring Straits, and a point in the Pacific Ocean, south of New Zealand, is diametrically opposite Great Britain.

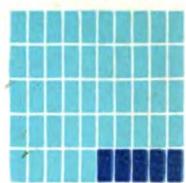
Seen thus, Earth's continental masses are clearly perceived as "joined by the salt-water that divides them." The areas of the world under Axis domination

(at October, 1943) are indicated in dark blue; the white areas (containing three-quarters of the world's people) are those in which the Allied Nations can mobilise food, fuel, man-power, resources and manufactures for their total struggle against the Axis; it is sea-power which brings this overwhelming weight of superiority to bear. The black symbols represent the exact position of all British ships at sea upon a specific typical day of peace, and are taken from Admiralty Chart B.R.135.

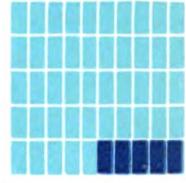
These symbols plainly indicate the sea-lanes along which the trade of the planet continually flows, linking producers of raw materials with manufacturers of finished merchandise, joining nation to nation, and people to people. The Axis-in-Europe is decisively cut off by sea-power from all participation in such traffic, and must depend entirely on its internal resources, and is equally decisively cut off from junction with the Axis-in-Asia; the capacity of the latter to maintain



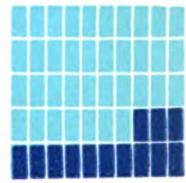
COPPER



NICKEL



MANGANESE



the vitally essential flow of sea-traffic among the scattered islands and archipelagos of East Asia and so to Japan itself, depends entirely on Japanese sea-power, already hard-hit by assaults, which are as yet on a tiny scale compared with the coming sea-and-air offensives. The importance of uninterrupted supply from overseas to the successful prosecution of modern war is indicated by the six smaller charts. These show, in dark blue, that proportion of the total world supply of each of six vital materials available (at October 1943) to both "arms" of the Axis, contrasted with the proportion available to the Allied Nations, as shown in pale blue. COPPER is a prime necessity of both marine and aeronautical engineering, and for all electrical equipment. LEAD is a basic requirement for shells and bullets, and also for many marine purposes. OIL, including both petroleum and heavy oils, is in very truth the life-spirit of mechanised war, by land, sea

and air. COTTON and WOOL are fundamental necessities for all peoples, and under the strain of prolonged war almost impossible to replace. NICKEL is essential for all high-speed machine tool manufacture. Without MANGANESE the processing of high-speed and high-efficiency steels is a practical impossibility. These six examples give some idea of the measure of sea-power's rigid control of war-making potential; food, livestock feeding-stuffs, and fertilisers are three further important classes of imports which sea-power denies to the Axis, in addition to a host of lesser products of fundamental or ancillary importance to the modern urbanised and industrialised State, in peace as well as in war—hard-woods, gums, essences, fibres, diamonds, gold, pigments, metals, coal and special fuels—the list is very long. All are supplied to Europe, and to Japan, to a greater or less extent, from overseas—all are controlled by sea-power.

their naval might secures similar advantages to great naval Powers ; there are, however, two other factors to be taken into account. One is the ability of aircraft to seek and destroy shipping by bombing and torpedo attack. The other is the ability of submarines to seek and destroy shipping by torpedo attack. These two types of onslaught evade the direct challenge of superior naval striking-power ; aircraft by their immensely greater speed and their domicile in a different element, and submarines by their hidden passage beneath the waves. Both these factors are fully dealt with later in this book, and their effects upon sea-war are justly estimated. At this stage, it may be said that aircraft contribute far more to naval power (as they do to military power) than they take away from it, and that the submarine menace to naval power can be met and worsted by air-power and sea-power operating together.

Control of sea-communications takes its place in modern times in the very forefront of war objectives, so far as the Allied Nations are concerned. For the Allied Nations, immensely superior though they are in potential war-making ability compared with their Axis opponents, rely altogether upon control of the salt water to bring those potentialities to bear upon the foe.

This introduces us to the second major function of battle-fleets. Where land forces originate upon continents separated by seas and oceans from their opponents, the safe passage of the seas becomes a *military* necessity of the first priority. It is the possession of superior battleship strength which makes for superiority of naval force. Superiority of naval force allows its possessors to make use of world-wide resources in time of war, and to deny those resources to the enemy ; it also enables military force to be moved to distant overseas battle-fronts.

The theatres of the present war, in terms of

military action, embrace every one of the five continents. The Axis has deployed *military* force in the regions of North AFRICA ; Western and Eastern EUROPE (at the gateways of ASIA) ; Eastern ASIA (in Burma, China and Malaya ; and in New Guinea, impinging upon AUSTRALASIA). Japan, the Far Eastern arm of Axis aggression, directly threatens the Pacific seaboard of the AMERICAS. That is the extent of the Axis threat, a world-wide plan of aggression. Against it are marshalled the forces of the British Commonwealth, the United States of America, China, the Soviet Union, and their Allies, *in numerous widely dispersed areas of the world from South America to Central Africa, from Iceland to the edge of the Antarctic, from Canada to India, from Australia to Panama, from Iraq to the Arctic Ocean, from the centre of the vast Pacific to the centre of the South Atlantic.*

The map of the world, so often shown on a "flat" projection (to enable us to see the relations of its *land-masses*), distorts the picture we must necessarily bear in mind when we consider the scale of the present war. The two views of the *globe* shown here demonstrate the extent to which sea-communications dominate the issue. The world-map on a "Homographic" projection, which includes all the earth's land-masses, enables us to estimate the problem of sea-communications in relation to the battle-fronts.

It is not possible continuously to survey and patrol the panorama of the ocean spaces which simultaneously divide and join the points of decisive action in the global war. Even aircraft cannot do this, not only because of their limited *range*, but because the high seas present them with average conditions of visibility far below anything experienced in the more stable atmosphere above the land. An area equal to half Africa or Asia may be blotted from human sight for days on end as a

S U P P L Y



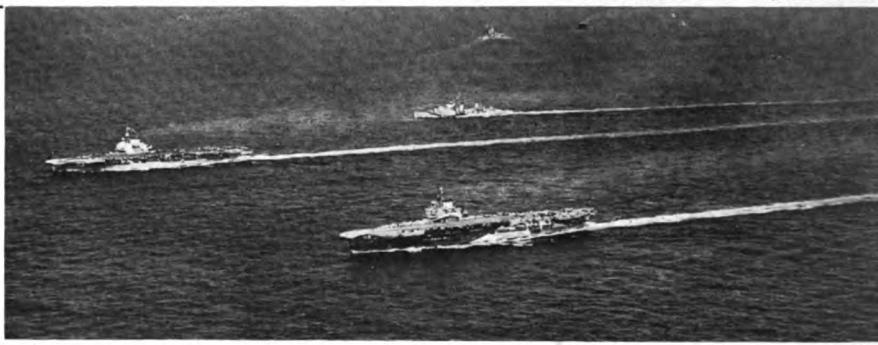
M O B I L I T Y



S U R P R I S E



I N I T I A T I V E



O F F E N S I V E





A four-day battle raged, through bitter winter weather, when one of the biggest convoys to Soviet Russia was attacked by bomb and torpedo-carrying aircraft and submarines. Precious cargoes of an immense tonnage were safely delivered at an Arctic port. This picture of a portion of the convoy en route shows a bomb exploding harmlessly, though close to one of the vessels.

centre of disturbance moves across the ocean. When it is considered that almost every square mile of all those scores of millions of square miles constitutes a possible zone of action in the war at sea, the magnitude of the tasks confronting sea-power begins to become apparent.

Cases to the point further emphasise not only that task and its successful accomplishment, but some of the advantages which such a situation bestows upon the nations with command of the seas.

The landings in 1942 of United States and British troops upon the North African shores involved 850 ships, including the warships which accompanied the expedition. This was then the greatest concentration of shipping upon a limited objective ever known. That concentration was a target of stupendous importance, truly a vital objective for Axis

air-power. To that small corner of the continent of Africa came the ships, literally "from nowhere"—because they came from the vast expanse of the North Atlantic, and the area it was possible to survey from the shore or from shore-based Axis aircraft is almost too small to be shown on our map of the world. Not one of the ships from Britain was lost.

Out on the North Atlantic go the Nazi submarines striking at the vital sea-communications between Britain and the Americas. If they could be re-fuelled and re-ammunitioned at sea by disguised merchantmen operating from neutral ports, short-range submarines could be designed as altogether smaller vessels, and could therefore be produced in far greater numbers. Moreover, their losses would be far less because of their lessened necessity to return to their bases on the heavily patrolled coasts of Europe. United

Nations' sea-power, however, makes the continued existence of such "depot" ships for submarines very precarious, despite those huge and hidden areas into which they can disappear.

Sea-power is thus seen operating to use "ocean-space" as an asset, in bringing safely out of its remote depths a great striking-force of ships, and turning that asset into a liability for the enemy, by forcing him to send under-water craft thousands of *non-operational* sea miles from their bases to their zones of action.

Again, the German battleship "Bismarck," one of the most powerful ships ever to sail, was sent out into "ocean-space," a marine monster capable of destroying most single vessels afloat, and certainly able to inflict irremediable damage upon Allied shipping and sea communications. Allied sea-power cut off that monster, moving pieces across the immense chess-board of ocean until the "Bismarck" was confronted with superior, and therefore destructive, naval force.

Another and a classic instance of the use of "ocean-space" occurred throughout the long Napoleonic struggle. A European conqueror who achieved dominion over or alliance with every nation on the European continental land-mass was continuously defied by British sea-power. The blockade of Napoleon's Mediterranean harbours was effected by ships of the line which lay out of sight of his coasts—themselves receiving news of ship movements from fast frigates which lay outside the range of shore-based guns and which were too swift and adroit to be engaged by more powerful vessels. The shore commanders could know nothing of the possible direction and force of the blockading fleet. When Napoleon fought in Spain, this identical power of appearing "from nowhere" at any selected point along a tortuous and barren coastline, bringing shorewards a conjectural force of men and arms, kept thousands of French troops con-

stantly on the move and deprived the French Army of their needed support.

The control of sea-communications through naval power has been shown to be the basis for the existence of battle-fleets. Once called into being, battle-fleets exert profound and far-reaching effects upon wars. The wider the scope of war, in the sense of extension of its range over greater and greater areas of the world, the more intense these apparently secondary effects become. There are important limitations upon the extent to which naval offensive power can decide actual land operations; these are discussed in the next section. But the only limits to the extent to which sea-power—the day-and-night control over the sea-communications of the world—can affect the final issue of *world-conflict* are limitations on the completeness of sea-power itself. To the extent to which sea-power can be fully applied, it will be decisive. It will be decisive because it gives its possessors (a) supplies, (b) mobility, (c) surprise, (d) tactical superiority and (e) *extra* offensive power; at the same time it deprives its opponent of the first four of these essentials to successful war.

(a) SUPPLIES. In world conflict, supply bulks larger than any other single factor in deciding victory or defeat. Napoleon said that armies marched on their stomachs. Modern armies only move and fight by drawing immensely upon basic resources in food, fuel and industrial output. Such materials as oil, coal, iron, hardening metals and rubber, measured in millions of tons, are sinews of war. Great industrial populations (who must be fed and supplied in their turn) are harnessed to the manufacturing processes which turn raw material into ammunition, guns, aircraft, vehicles, tanks, ships and a host of ancillary machines and equipment. This concentration on manufacture in its turn deprives agriculture of man-power.

It is thus true to say that war on the planetary

scale resolves itself into a battle of endurance. Unless swift victory is secured by one side or the other, production-power and man-power become of more moment than immediate offensive-power. Then the side which has the sea-power can draw upon richer resources of both than can its opponents. Potential supply is vastly greater, and actual supply is fully secured by overseas communications.

(b) MOBILITY. The old-time United States General who defined strategy as "the art of getting there first with the most men" summed up one of the most vital factors in winning battles. Napoleon's *speed* of manoeuvre and deployment shattered the old-fashioned formalities of European war-making. The lightning marches of Richard the First of England, and his uncanny assessment of terrain without the aid of maps, enabled him to win every pitched battle he ever fought. Oliver Cromwell's mobility in battle, to which German writers have paid so much attention, gained him great victories. The Nazi *blitzkrieg* puts all the emphasis on movement and power by utmost use of modern mechanisation in vehicles, aircraft and fire-power. The magnificent Soviet onslaughts which have crumpled and thrown back the Nazi line in the East, by sweeping forward at diverse points in great force, again put the accent on mobility. The British Eighth Army (assisted by seaborne supply on its flank) and the United States and British forces in North Africa (also supplied by sea) are further evidence of the importance of *movement*, in mass and at speed, for the forcing of favourable military decisions. On the negative side, mobility tells greatly when an outnumbered army must be saved from annihilation. The fighting Soviet withdrawals into the land-space of their hinterland, the successful evacuation of the entire British Armies from France when their stricken Allies succumbed on their right and left, and the

British and Chinese withdrawal from Burma, are episodes in which mobility kept armies intact and deprived the enemy of full success.

In world-conflict, where war is waged across great distances in widely separated theatres, sea-power alone gives that supreme mobility which does so much to decide the issue.

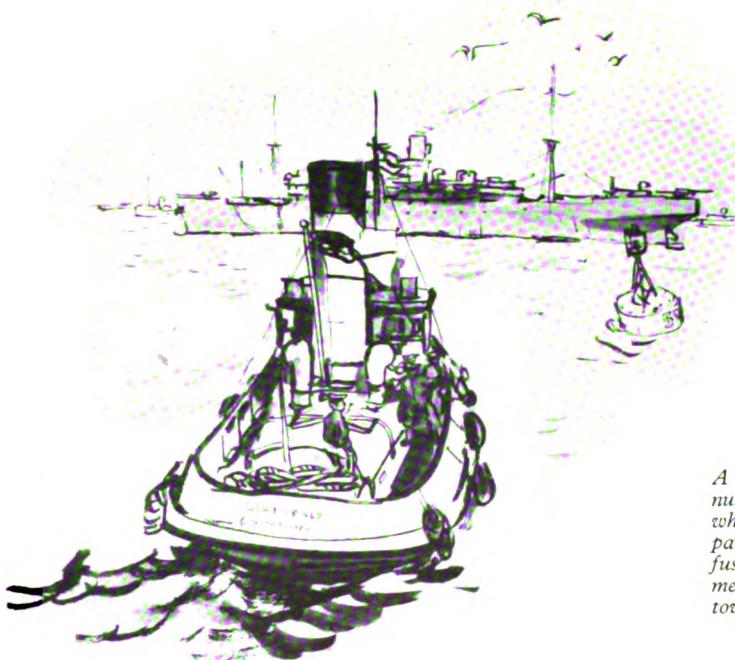
(c) SURPRISE. The element of surprise is perhaps the greatest achievement of mobility, as evidenced by the Soviet counter-offensives ; the North African campaign has shown how sea-power can bring to a selected coast, out of the unreconnoitred "nowhere" of ocean space, a vast army and armament, with total surprise. Surprise attends sea-operations by virtue of the aquatic element upon which they are conducted. The sea can never be completely surveyed. Intelligence is defeated. Therefore, sea-power can make use of the threat of surprise, as well as surprise itself, and keep land and air forces contained by the mere possibilities of inimical action.

(d) TACTICAL SUPERIORITY. This is the sum of the preceding assets, with the wider implication of their total impact on a war in which (more perhaps than ever before in the long history of wars) the ability to choose the battle-ground and to force your enemy to attend you there or suffer the direst consequence, is likely to be decisive. Sea-power makes possible the assembly upon a given terrain, at a given time, of the necessary force to achieve a given objective, and by thus placing the vital initiative in the hands of its possessors it enables long-term planning for victorious offensive to be successfully undertaken.

(e) EXTRA OFFENSIVE POWER. When the total resources of two sides are marshalled for the final struggle, when sea-power has secured a *favourable balance* of those resources, when sea-power has given superior *mobility*

and superior *surprise* to those resources, when by the proper direction of these, sea-power assures the *tactical initiative*, there still remains sea-power's own dread offensive through the medium of the battle-fleets, through naval landings and through seaborne aircraft. No land artillery possessed of mobility can be compared with the great naval guns. A battleship can discharge in a single broadside some ten tons of penetrating high-explosive shellfire across a distance of twenty miles ; in less than one hour of action a battle-fleet might blast a shore objective with 500 tons—more than any single town in Britain received from the air in an entire night's raiding during the German attacks of 1940 and 1941. Smaller naval units can put ashore in support of military operations very considerable forces of highly trained fighting men. Aircraft carriers can attend shore landings with air support sufficient to "hold the air" until air bases ashore are secured, manned, equipped and reinforced with land-based aircraft. This is sea-power's *extra offensive*.

Sea-power has been defined as the control of sea-communications. The battle-fleets have been described as the logical outcome of sea-power's maintenance, against all threats, of that control. The effects of that control upon the issues of a war which involves the whole world have been indicated. The increasing importance of the "secondary effects" of the battle-fleets in relation to the world conflict has also been touched upon. Now it is necessary to complete the picture, to descend from the general to the particular, and to examine, non-technically but in some detail and in due order, how in day-to-day conflict with a relentless foe, unlit by the fierce glare which illuminates great battle-actions, grimly, persistently, obscurely and successfully, the great work of sea-power goes steadily forward ; how air-power and under-water attack affect it, how the Allied Nations' assembled sea-power compares with that capable of being gathered against it by the Axis nations, and how land, sea and air-power together can defeat any combinations of but two of these.



A harbour-tug (one of the numerous types of "little ships" which play obscure but necessary parts in maritime organisation) fuses off towards a moored merchantman which later she will tow out to the seaway.

III. THE NARROW WATERS AND THE OPEN SEAS

Sea-power's daily world-wide tasks

THE MONOTONOUS toil of its day-by-day activities is very much the larger part of sea-power's operational task, and if it goes forward little noticed and less honoured, that is in accord with tradition. Those in peril on the seas, in peace as well as in war, are apt to be out of mind with those ashore, for the simple, human reason that they are out of sight. They are below the horizon. It is often difficult for the landsman fully to appreciate that sea-power (even in its most dramatic and successful roles) operates at long range. The "naval shield" which for eight hundred and seventy years has kept the invader from the shores of Britain does not lie out in visible ramparts of steel betwixt Britain's coasts and the continent of Europe. It moves and has its being on the high seas. Similarly the remorseless processes by which Britain's sea-communications are controlled are carried on at a thousand scattered points of the earth's surface.

The name of Winston Churchill has rung round the world since he assumed the captaincy of Britain's Ship of State in its most glorious hour of danger. But Winston Churchill was First Lord of the Admiralty—the civil head of Britain's Royal Navy—both in the last war and in this. These words of his say everything of the naval task confronting sea-power : " *It is not only in those few glittering hours—glittering, deadly hours of action which rivet all eyes—that the strain falls upon the Navy.*

Far more does it fall in the weeks and months of ceaseless trial and vigilance."

What are the ships and their equipment, the men and the machines, upon which this unending strain tells so heavily—and upon what bases and installations ashore do they rely for their sustenance and support? To answer this question is to lay before the reader the whole intricate fabric of *sea-power in action* . . . truly world-wide in extent ; highly organised in its detail ; efficiently mechanised at every point where mechanism helps ; superbly manned by personnel who are trained to scientific perfection in their duties, who are admirably disciplined, and wholly animated by that zeal for professional excellence and pride in their Service which count more heavily, even, than enthusiasm for a cause. The Royal Navy—Britain's Royal Navy—is the symbol and pattern of seamanship the world over. It has set the standard. Alike upon its techniques and its usages, upon its organisation and its uniforms, is based the practice of most of the navies of the world. Britain's Senior Service, with its associated ships from the Dominions, is joined with the United States Navy (the two most powerful fleets in the world) and supported in the tasks it has to do by units of the navies of many Allied nations.

The vessels of war thus welded into the instrument of Allied sea-power comprise a vast range of types. Their classification is

best made clear by a survey of the broad distinctions between their various functions. Thus, for battle, reconnaissance, patrol, convoy, supply, minelaying and minesweeping, coast defence and coast bombardment, and training, to name ten important branches of naval work, diverse types of warships have been developed.

As it is the *strategical necessities* of these different functions which diversify the types of naval ships, attention must first be directed to one important factor in naval strategy: the difference between "narrow waters" (coastal seas, shallow and difficult of navigation, partially covered by shore guns at selected points and by concentrations of shore-based aircraft), and "open seas" (that ocean-space, remote from shore control, where sea-power—including its ancillary ship-borne aircraft—reigns undisputed).

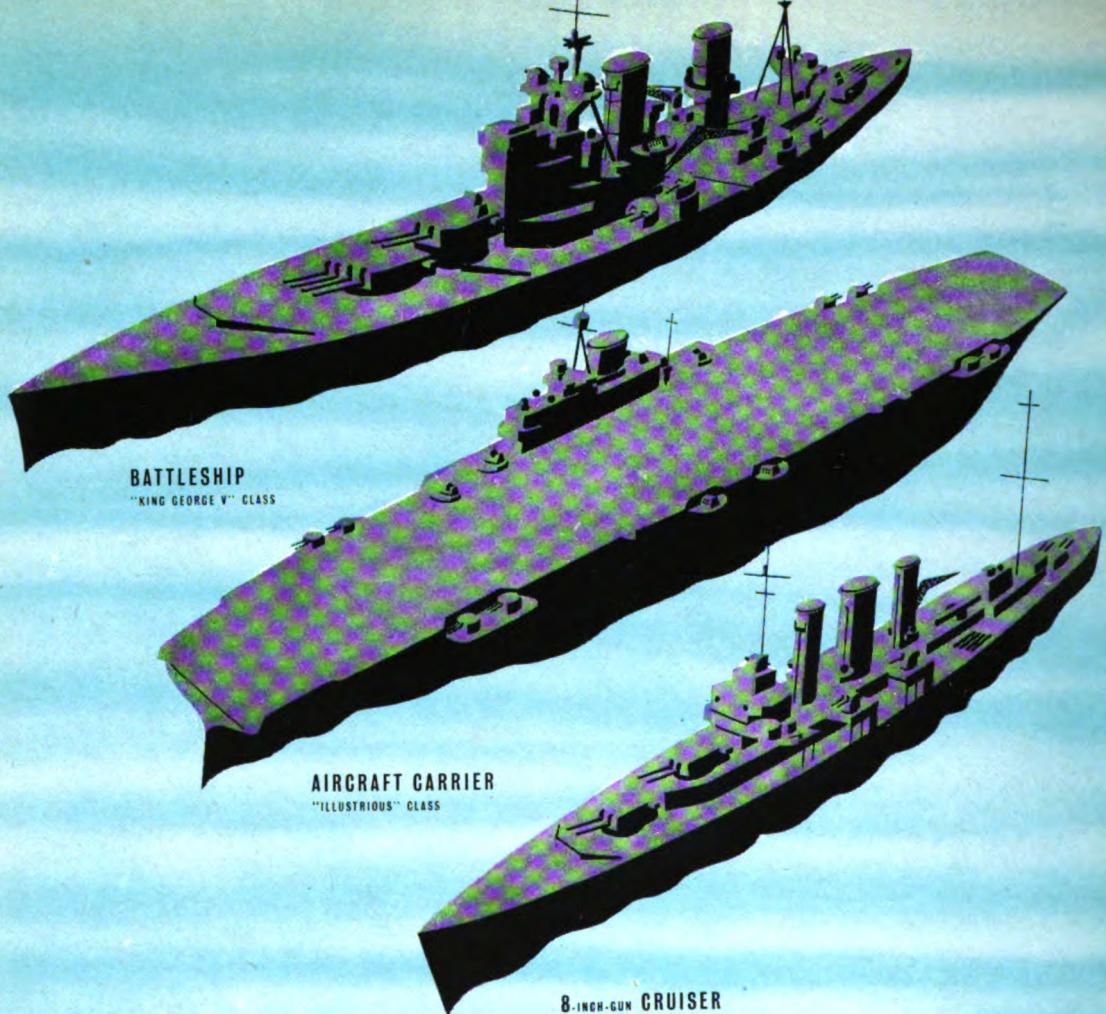
A naval vessel is a ship first and a unit of the armed forces only second. Ships operate within the limitations of their environment—so, indeed, do aircraft, tanks, mobile guns and mechanised transport ashore. It is necessary for all of these to take "avoiding action." An aircraft takes avoiding action if surprised by a hostile enemy aircraft, or caught in the field of fire from ground-defences; a tank takes avoiding action if confronted by a concentration of anti-tank guns, or in the stress of a tank battle; motor transport takes avoiding action by dispersal when dive-bombed or shelled. A ship takes avoiding action, by altering her course, from torpedo attacks or air bombing attacks.

Within a restricted space, such as the estuary of a river, upon the waters of a bay or inlet, or between headlands and islands, or close to the coast, a ship's ability to make quick changes of course depends upon her size and draught. Reefs, sandbanks, tides, currents, shallows—

all these present problems of navigation which beset a ship when traversing the apparently smooth surface of the water upon her lawful occasions in time of peace; in time of hectic battle they limit severely her essential power of manoeuvre. Thus it is that large naval units feel most secure and at home upon "blue water," where only wind and waves and the enemy come into their reckoning.

It is in the just estimation of this fact that a clue will be found to some features of war at sea which to the layman have seemed to substantiate German claims to the effect that air-power has changed the historic balance between land and sea, in favour of the land. These claims are best examined thoroughly in the light of actual events during this war—as is done painstakingly in a subsequent section—but to realise how enormous is the proportion of naval duty which is carried on far beyond the operational range of land-based aircraft (and how truly vital to victory that proportion is, how truly the real contribution of sea-power in maintaining sea-communications) is to realise that air-power and submarine-power together have done very little to challenge sea-power's supremacy.

From a thousand seaports scattered upon all the coasts of the free world outside Nazi-controlled Europe, gather the merchant ships which ferry the provisioning and armaments of the United Nations across the ocean-space which separates sources of supply from the battle-fronts. The merchantmen sail in convoy: that is, they report from their home harbours to a secret meeting place; they gather there into formation, shepherded by *destroyers* and the smaller escort vessels now known as *frigates* and *corvettes*, while overhead, shore-based aircraft reconnoitre their route far out to sea. There are never less than 2,000

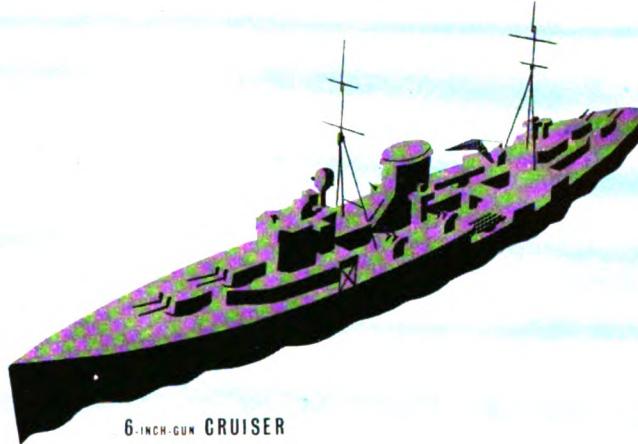


TYPES OF WARSHIPS IN BRITAIN'S ROYAL NAVY

British merchantmen thus engaged in ocean transit to feed and munition the armies and the great working populations who wage unceasing war on the Axis; and they are protected by over 600 ships of the British Navy alone, aided by naval aircraft and aircraft of Coastal Command of the Royal Air Force. Millions of sea-miles every year are sailed by the protective escorts of the hundreds of convoys which take the seas continuously—these are, in sober fact, the life-lines of

Democracy at war, and a mighty host of warships is ceaselessly engaged in guarding them.

The work is intensely exacting. There is an incessant strain in watching, and in keeping touch among numbers of ships spread widely over the sea, without a glimmer of light, and often in conditions of storm which would severely tax seamanship even without the crowding of the route by numerous vessels possessed of varying speeds. The imminence of furious attack from the hidden enemy below



6-INCH-GUN CRUISER



DESTROYER
"JAVELIN" CLASS



DESTROYER
"TRIBAL" CLASS



SUBMARINE
"T" CLASS

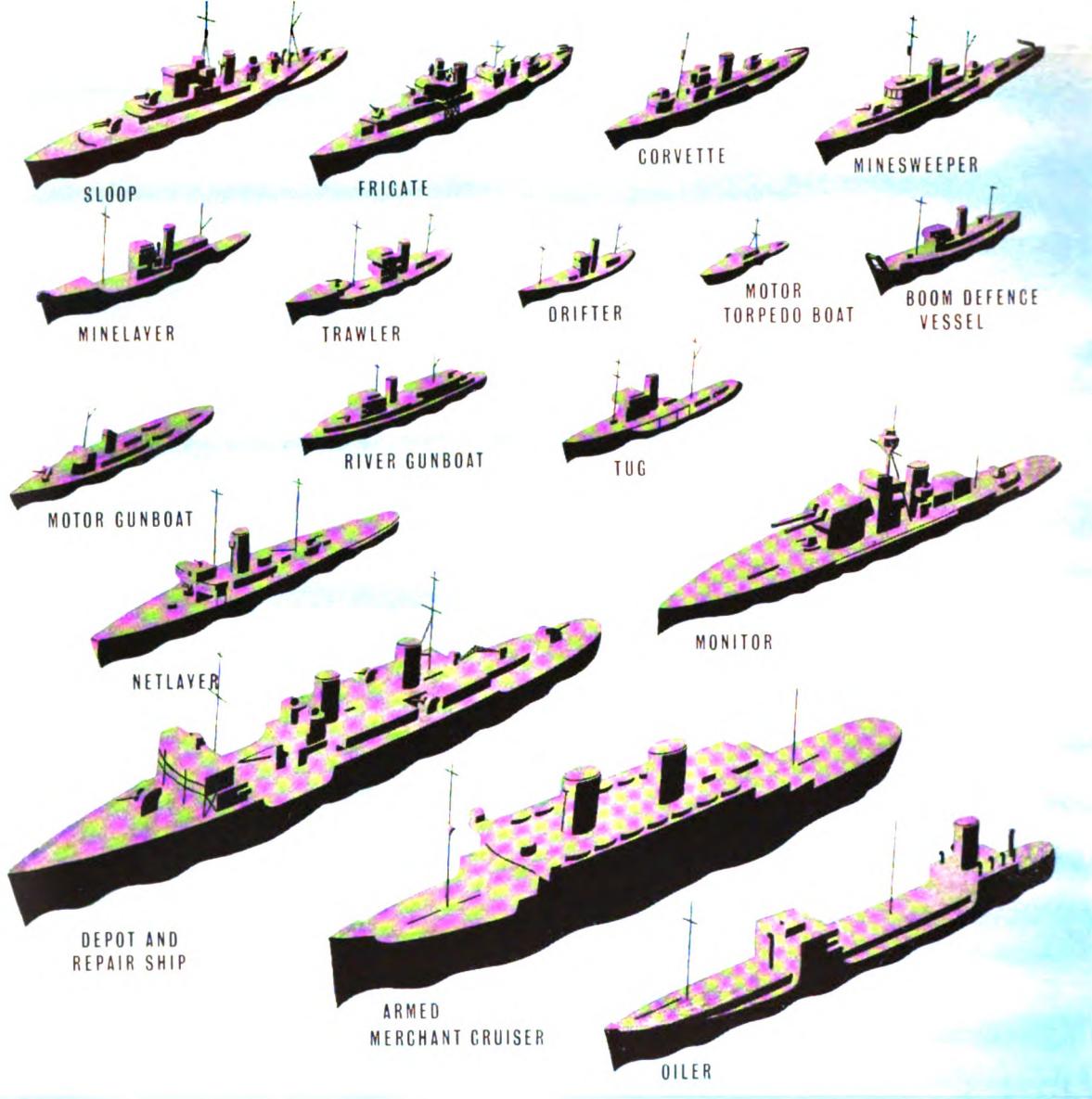


SUBMARINE
"SEVERN" CLASS

the surface calls for instant readiness to attend action stations by every man during every minute of the journey. Through it all, by sheer brute effort manfully done, the men of the navies and the merchant crews have brought from ports of embarkation to ports of destination over three hundred millions of tons of cargoes which sea-power has massed against the Axis.

Against some of the convoys—notably those to the Soviet Arctic ports—the enemy mounts

his offensive on a massive scale ; units of his idle battle-fleets immured in Baltic and Norwegian ports sally out under the protective cover of clouds of bomber aircraft which travel shuttle-wise to the location of the convoy. British battleships are there to seek the longed-for engagement with Germany's capital ships, and British aircraft carriers pour into the sleet-masked skies their torrent of defensive fighters. From every deck the concentrated anti-aircraft fire puts up an



explosive curtain to force air-raiders away from their objective: the air immediately above the decks of the merchantmen. The convoy goes through, taking tanks, aircraft, guns, ammunition, food, clothing and medical supplies to the support of the great Soviet land offensives against Germany. Losses there have been, but they have been but a small fraction of the

amount which has been landed in Soviet ports.

The passage of troops across the oceans is another vital contribution to the Allied Nations' world-wide war. More than three millions of fighting men have been transported under the protection of Britain's Navy alone. Of this immense host, sent in heavily guarded

convoy, a total of but 1,348 men—killed, drowned and missing—had been lost by early 1943. For every soldier lost at sea, more than 2,200 had arrived safely, with their arms and equipment.

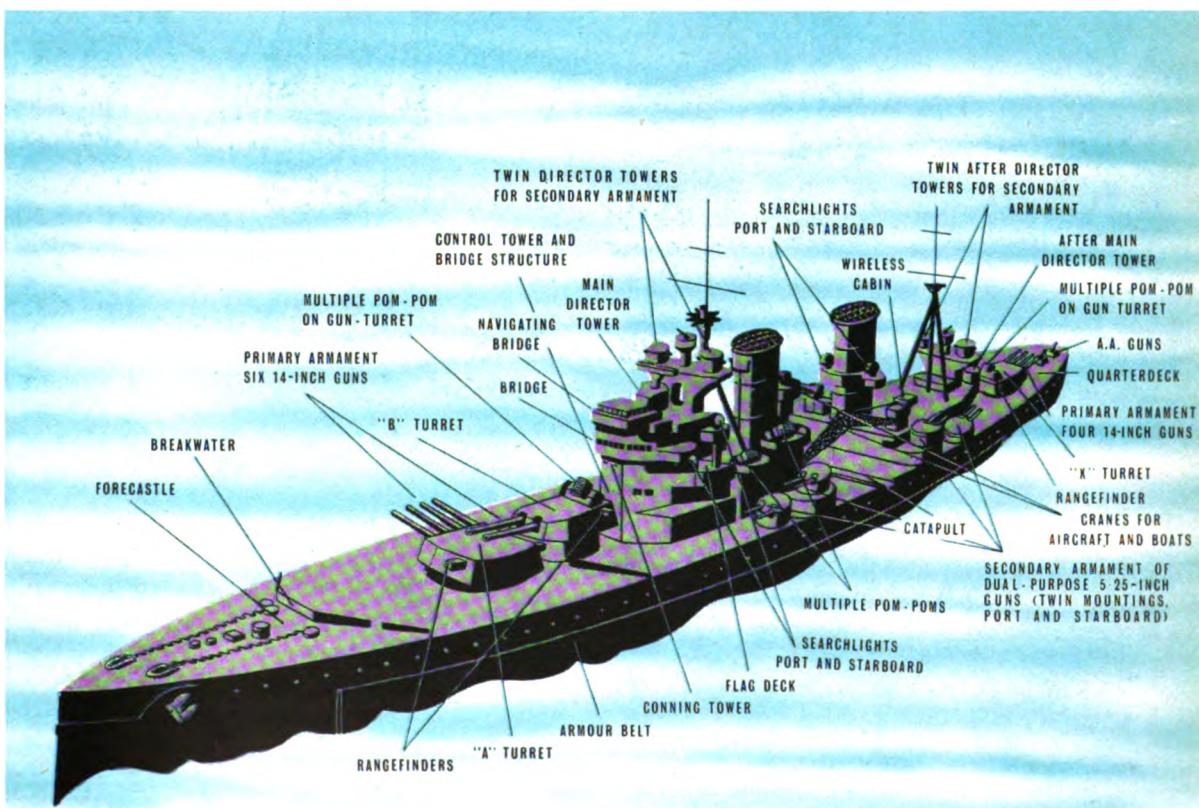
In addition to these great duties of escort, convoy and protection to high seas shipping, the navies must keep constant watch on enemy ship movements. His battle-fleets, his surface raiders and his diminishing tonnage of merchant ships must be penned in their bases, or attacked

and sunk should they venture to creep down any part of a thousand miles of coastline in the west, from the North Cape of Norway to the fortress of Gibraltar, and along the hundreds of miles of French and Italian coasts in the Mediterranean Sea. The long sea-route from Britain to the Middle East war-centre, round the whole of the African continent, the Red Sea itself, the Indian Ocean, and great areas of the Pacific Ocean down to Australia, a world's width away, must be patrolled.

THE MOBILE FORTRESS THAT IS A CAPITAL SHIP

A Battleship of the "King George V" class dissected

Ships of this class are armed with ten 14-in. guns and carry four aircraft. In this diagram one of the forward gun-turrets is trained to fire off the ship's starboard quarter. The diagram shows details of the control tower, which is heavily armoured, and above which are the bridge and principal controls for navigation and gunnery. Duplicate controls permit the ship to be fought even should the tower be destroyed. The drawing shows, too, how the vital parts of the ship are protected by an extra-heavy belt of vertical armour plate.

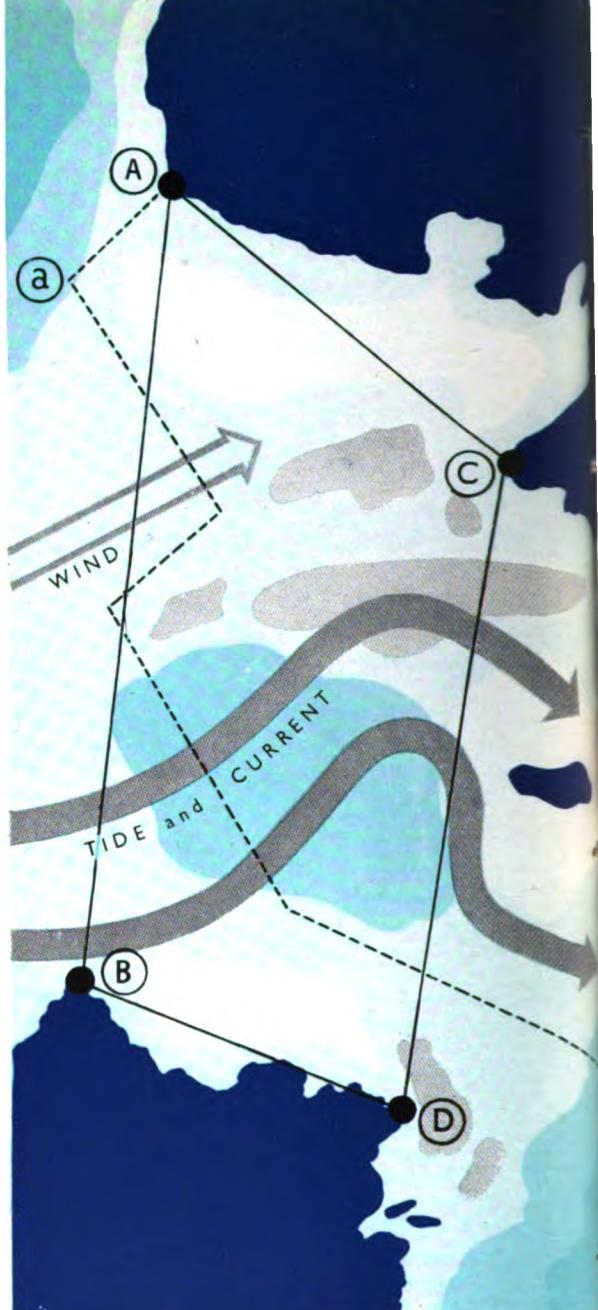


Upon the approaches to the enemy's coastline, and in all the waters surrounding Allied ports, minefields must be laid down, through which hostile vessels pass at their peril. The enemy's attempts to sow mines by air in Allied waters must be met by regular sweeping of the channels, marked on secret Admiralty charts, through which friendly shipping runs.

Constant surveillance of the coastal waters by air and sea is necessary. Lightships and navigation marks must be protected and maintained. The stoppage of all access by the enemy to the trade and resources of the world overseas, and to the benefits of water transport round European coasts, must be enforced, by boarding and inspection of all shipping at control points and the issue of navicerts to neutral cargoes which bring no benefit to Germany or Japan. It can readily be seen how great a concourse of ships, of every tonnage and type, is engaged upon this multitude of tasks. It is the day-by-day routine of sea-power in action.

Naval support of land operations upon enemy territory and naval support in Combined Operations (Commando) make a big claim upon ships and men. Never yet have the navies failed joyously to meet it. Norway, France, North Africa, Greece, Crete, Malta, Iceland, Libya, Italian Somaliland, Sicily, Italy—upon all these areas naval power has been brought to bear in the shifting circumstances of a naval war. The control of sea-communications has enabled the Allies to make their moves at will upon the chessboard of the world, while at the same time the major tasks of sea-power have been unremittingly discharged.

It is proper to consider some of the naval battle actions that have taken place—but it is important to see these in their true perspective against the background of persistent convoy,



blockade, protective patrol and reconnaissance which go on all day and night, every day and night, upon the narrow waters and the open seas. . . .

NEAR-SHORE NAVIGATION MAKES THE TAKING OF "AVOIDING ACTION" DIFFICULT

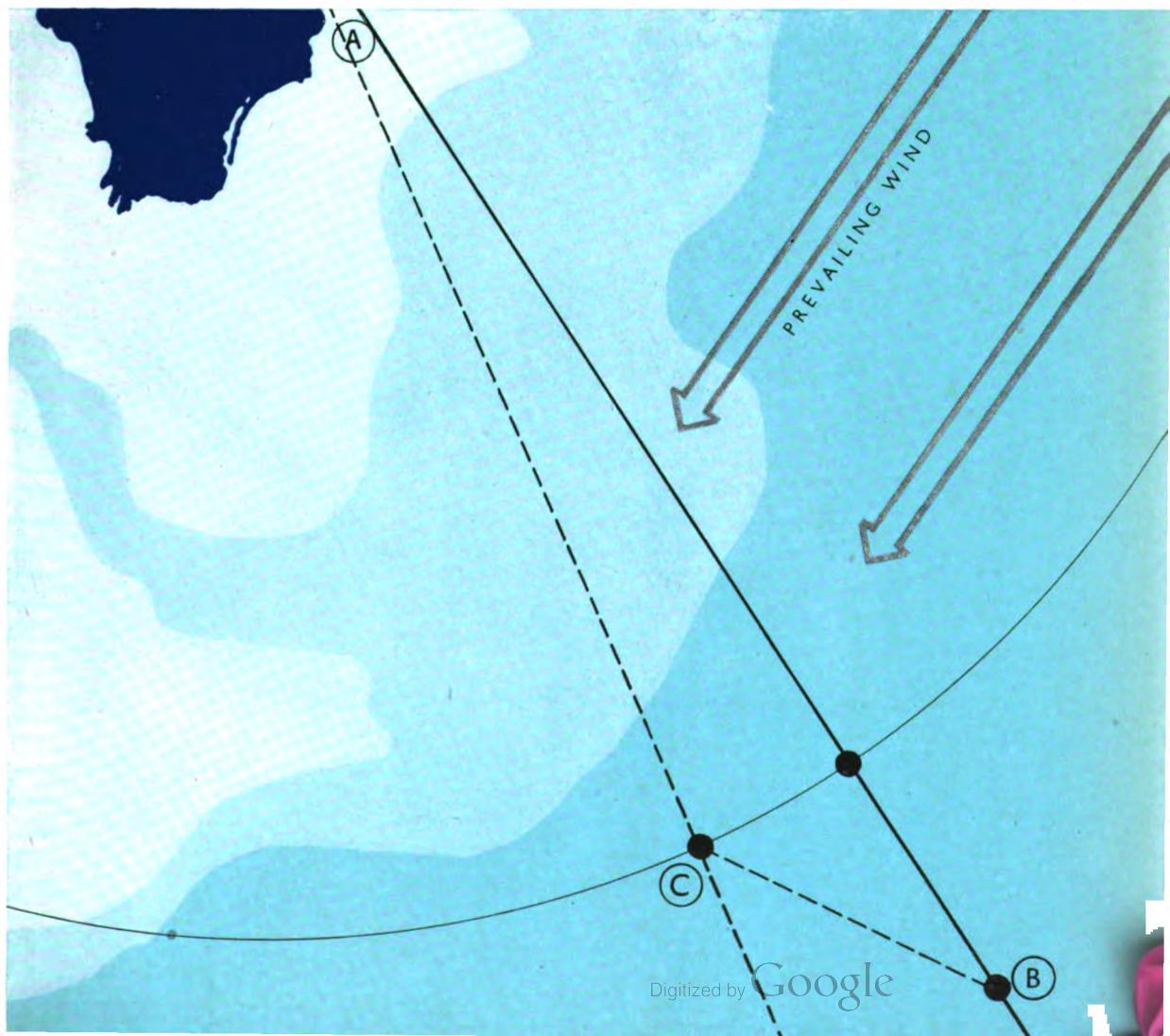
A ship must often navigate a zig-zag course when near the coast, because contrary currents, shallows, tide and winds combine to determine her route. Left, a vessel leaving point A must meet the prevailing wind (open arrow) and tricky tide currents (solid grey arrows) which are deflected by the sand banks (pale grey) and shallows (white). A bearing is taken from A to B, and the ship will sail a few points to starboard (the right-hand side of the ship, when looking forward)

off that bearing (Aa), to clear the shallows; the wind will take her to port (the opposite, or left-hand side of the ship) when she endeavours to sail on the bearing A-B with a set course. Soundings will be taken for depth of water, and bearings on other points, C, and later, D. By counteracting the currents, tides and wind, and estimating her position by bearings, the ship can navigate the deep water in safety, but she will have little margin for manœuvre if attacked from the air.

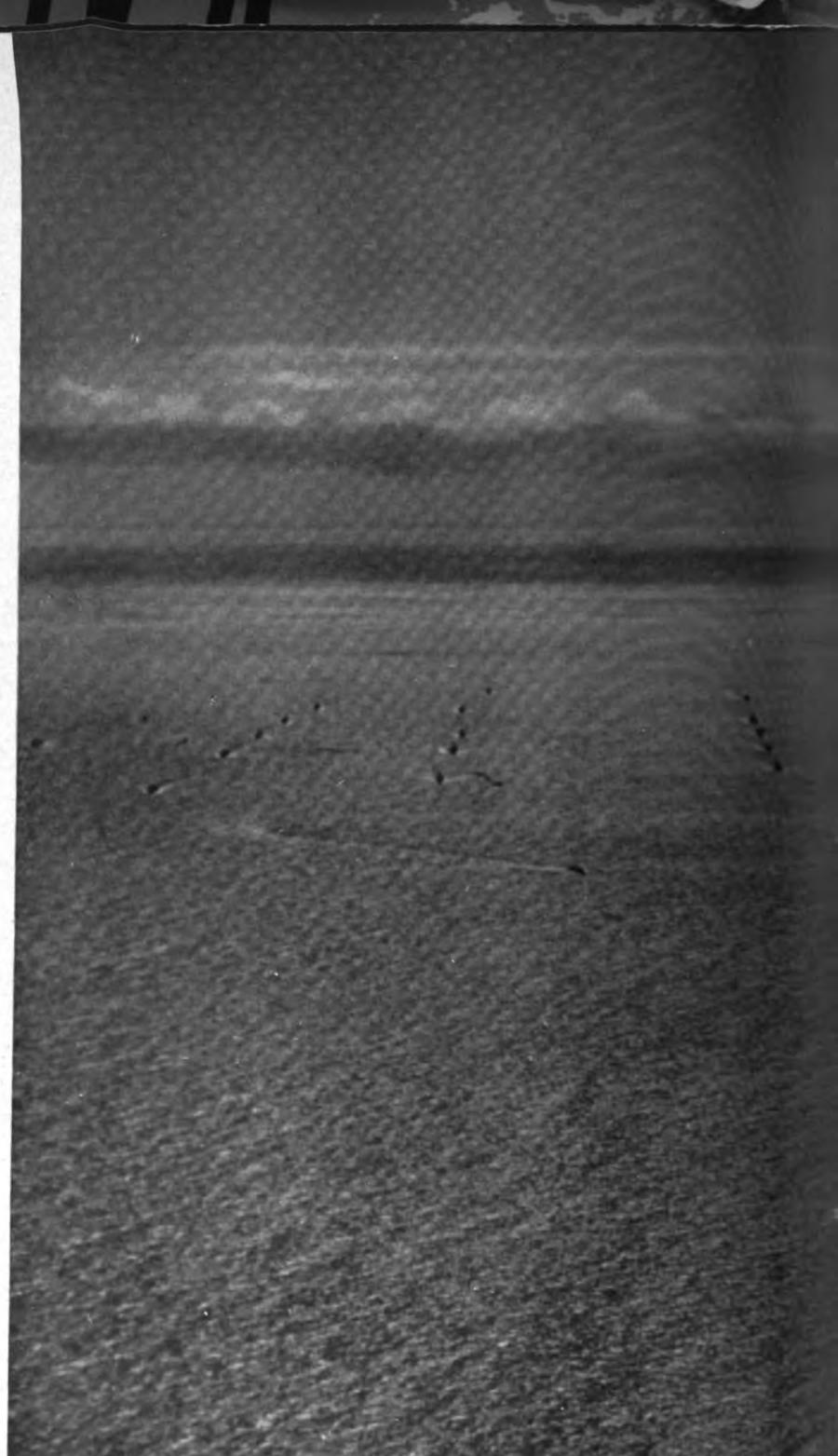
OPEN-SEA NAVIGATION ALLOWS FULL POWER OF MANŒUVRE

A ship clearing the coast at A and with safe depths of water before her to point B in mid-ocean, will "set" her course by compass and sail it for a given number of hours calculated to bring her to it, at a given speed. But the wind on her port beam deflects this course to point C, where on a line of latitude true bearings by the sun determine her position on the chart and a fresh course can be laid to correct the error. (If no

correction had been made, and the wind remained constant, the ship would continue on her wrong course with an increasing error.) In such circumstances, a ship is entirely free to make any changes of direction and speed, and to take any avoiding action necessary — her course can always be set by compass and checked by observation of the sun. This is why a ship on "blue water" is less vulnerable to air attack.



A remarkable aerial photograph of an Allied convoy at sea, taken from an escorting aircraft of Coastal Command of the Royal Air Force operating under direction from the Admiralty. This picture gives a fine impression both of the vastness of "ocean-space" and of the limits to clear visibility at sea even under good weather conditions. Particular attention is drawn to the cloud shadow towards the horizon and to the merging of sea and sky upon the horizon itself. Modern camouflage and the elimination of glittering brass and other sharp points of reflected light make the presence of ships at such distances hard to detect. The picture gives authenticity to the artist's impression in colour of a convoy at sea, reproduced across the front and back covers of this book.





"CONVOY TO MALTA has been continued uninterrupted . . . to maintain the island and to enable it in due course to turn from stubborn defence to punishing attack." Here, an escorting cruiser throws a smoke-screen across a convoy from Alexandria to Malta, while the forward 5.25-in. guns of another cruiser fire at units of the Italian Fleet endeavouring to interrupt the convoy's passage.

Naval action has consistently thwarted Axis ambitions for junction and expansion

IT IS of first importance, for an understanding of sea-power in action, to realise the effects of a "fleet-in-being." Simply expressed, this is a principle of naval strategy which asserts that a powerful battle-fleet exerts its influence upon the naval tactics of belligerent Powers by its mere existence—even if it does not put to sea. This is obviously significant to-day with respect to the hitherto largely immobilised fleet of Germany. The British and Empire navies and the United States Navy are the strongest combination of sea-power in the world. But in their dispositions about the seas of the world they must take full account of all possible local concentrations of enemy force against them. And in weighing the risk of losing ships against the possible prizes of successful action, enemy "fleets-in-being" must be carefully reviewed lest British and Allied supremacy at sea be jeopardised. With these and other grave considerations ever before them, those responsible for planning Britain's sea-war press relentlessly on with the offensive.

The German Fleet is a powerful combination—a "fleet-in-being" which includes some of the world's biggest warships. It is kept continuously under surveillance lest it should intervene in the war at sea to the disadvantage of Britain's control of sea-communications; that control is necessarily carried out by

dispersed, and therefore very often locally weak, sea forces. The end of a short career of spoliation carried out by the "Graf Spee"; the enforced habitation of the German 26,000-ton battle-cruisers "Scharnhorst" and "Gneisenau" in harbour; the brief sea-life of only five days of the new and most formidable battleship "Bismarck" (the rounding-up and destruction of which in itself makes an object-lesson in naval control of those vast ocean-spaces, across 1,750 miles of which she was patiently pursued); all these give the measure of Britain's naval might in action against the Axis fleets.

The Japanese Navy is the third largest in the world. It represents a "fleet-in-being" which exerts tremendous influence on the strategic problems of the great watery domains of the Pacific. Calculated treachery gave Japan initial successes, as it gave them to Germany in her initial attack on the Soviet Union; the stabilisation of those successes depends absolutely on the ability of Japan's partner-in-aggression to hold her gains. And it is against the whole of the Axis that the might of ever-growing British and United States sea-power will work with increasing and irresistible force, to the inevitable victory.

The feats of the Allied navies in active
(Continued on page 30)

This panorama shows how the great convoys reach Russia throughout the long Arctic night.

1. Convoys of United Nations merchant ships, escorted by cruisers and destroyers and an aircraft-carrier of the British Navy, and preceded by minesweepers, pass on their way to Russia.
2. Capital ships of the Royal Navy cover the convoys against attack by enemy surface units.
3. "Hurricane" fighters launched by catapult from the decks of merchantmen rise to attack approaching enemy dive-bombers and torpedo-bombers.
4. "Sea Hurricanes" and "Fulmars" leave the decks of an escorting aircraft-carrier to meet long-range German torpedo-bombers.
5. Light enemy naval units leave Norwegian fjords in search of the convoy.
6. Soviet fighter planes fly out to ward off enemy bombers from an incoming convoy.
7. Soviet naval units approach an incoming British convoy.
8. Russian icebreakers keep the harbour approaches clear all the year round.
9. Enemy U-boats, from the shelter of the fjords and occupied harbours, attempt to intercept the convoys.
10. Enemy reconnaissance bombers dropping flares in the Arctic night in search of British convoys.
11. Enemy torpedo-bombers being brought down by concentrated fire from A.A. ships.
12. An enemy dive-bomber fouls a convoy's balloon barrage.
13. U-boats attacking convoy being destroyed by depth charges from a destroyer.
14. A convoy reaching Russian territory.
15. Rapid unloading at a North Russian port before . . .
16. . . . entraining for the Russian front.

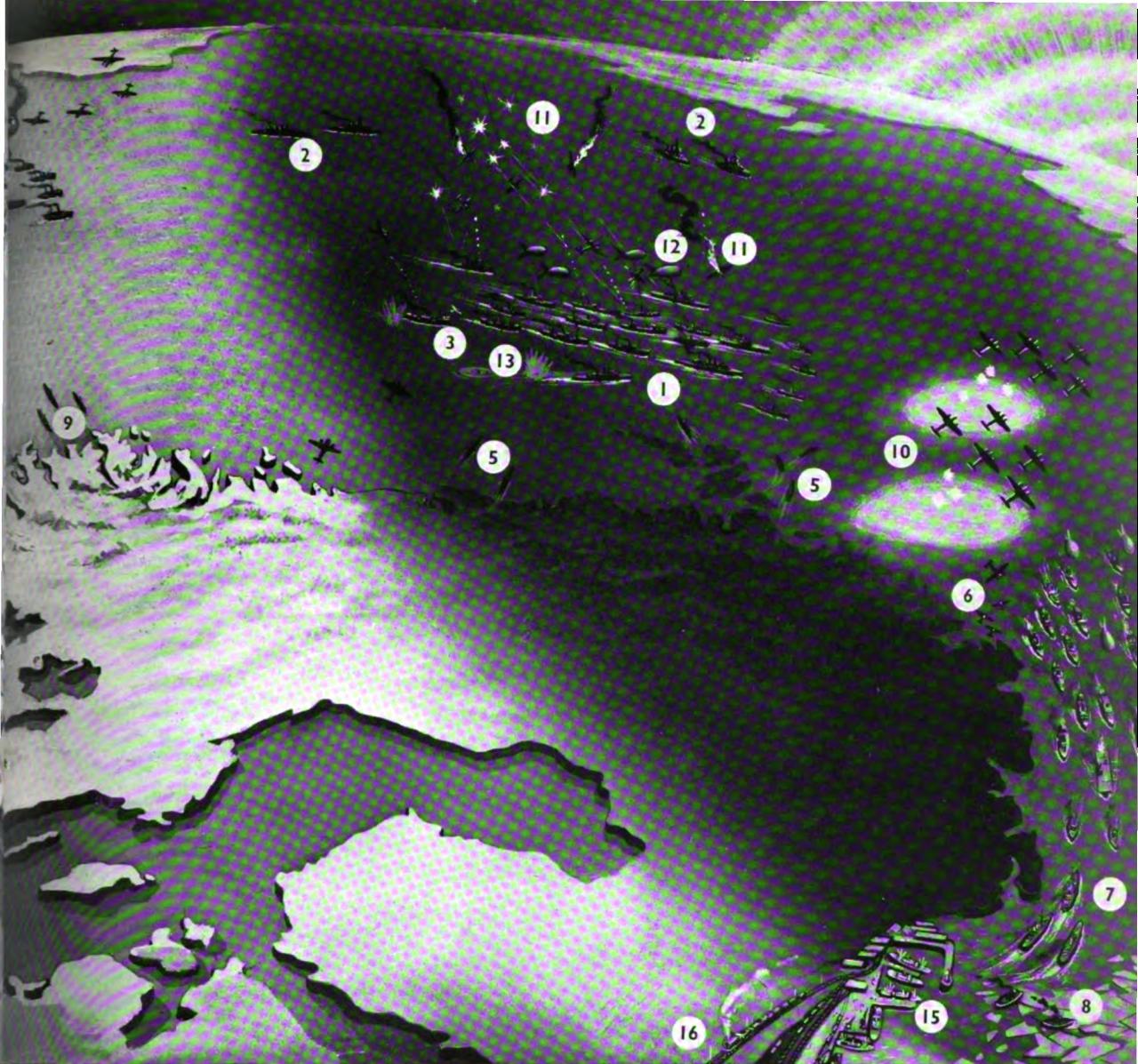
A new and vital chapter has been opened in the fiercest sea-war in history. The trend that chapter has taken may very well influence the ultimate outcome. The whole world was following the announcements and bulletins from all belligerents about that great Anglo-American convoy to Russia in September 1942.

Berlin made staggering claims of sinkings. Long lines of British warships, long lines of British, American and Russian freighters, their holds stacked with vital supplies for the gallant Red Army, were fighting their way through the heaviest torpedo attacks of the war.



They did not break wireless silence with details until they were at their journey's end—in Russian ports. And when they did, it was found that the majority of the ships had got through; that not a single escorting warship had been lost, and that of the four British planes lost the pilots of three were safe, and that Germany lost 40 planes for certain and many more were damaged.

It was known that the British Admiralty had been perfecting new convoy tactics, and that the last convoy to Malta was only the start of new methods for driving ships past all the dangers which might be expected



from Axis shore-based aircraft and packs of U-boats. The large convoy to Russia was to be the big test of new tactics.

If the majority of convoys can sail safely to North Russian ports, if ships could run the gauntlet of planes and submarines through the Mediterranean to Malta, if British ships can sail constantly under German guns and aircraft through the 20-miles-wide Straits of Dover, then British ships can sail anywhere. . . .

Ships are the stepping-stones to victory. Ships with men, weapons and stores link up the battle-fronts.

This convoy to Russia had with it a mighty escort of 75 British warships. The Germans themselves saw 30 of them, which, they said, included "several" big battleships of Britain's new "King George V" class. For obvious reasons the British Admiralty refuses to say of what precisely this gigantic escort consisted, and which ships participated. But it is no longer a secret that four "King George V" battleships are now in commission. In addition, an American "Task" force strengthens the British Home Fleet. And big developments have been taking place to carry fast, powerful aircraft into the battles of the seas.

conflict with the foe show the power of the sea-arm to influence the fluctuating course of the war. Not only is it seen that Allied sea-power pervades the world-scene to an astonishing extent, reaching to the remotest places of the globe, but that it can also inflict terrific punishment on the enemy.

A modern *battle-squadron* will consist of a number of *battleships* escorted by *cruisers* and *destroyers*, with, very probably, *aircraft carriers* operating many miles away. The battleship is in reality a floating fortress equipped with devastating fire-power. Everything aboard her contributes to the feeding, manning, protection, carrying and range-finding of her guns. Against ships of a lesser status her force is annihilating. A modern battleship's fire-power will destroy lesser ships from a range at which they are unable to make reply, and her speed will make it difficult for such vessels either to close that range, or to extend it to a safe distance.

As battleships move into action, far-flung screens of fast destroyers search the ocean-space for the adversary, aided by reconnaissance aircraft from the battleships and their attendant cruisers, and endeavour to slow a retreating enemy by torpedo attacks. Cruisers, also possessed of high speed, but more heavily armed and armoured than the destroyers, try to make contact with the enemy force, to draw it if possible towards the capital ships. Aircraft from the distant carriers, moving seven miles while the fastest ship engaged moves but one, also co-operate in bringing the foe to battle, and by bomb and torpedo attack engage his forces.

Thus far, we have considered naval units in battle-action. But each of the component parts of a battle squadron—battleships, "heavy" and "light" cruisers (normally, cruisers with 8-in. guns, and cruisers with 6-in. guns respectively), destroyers, aircraft

carriers and their attendant aircraft (bombers and fighters both) all have other tasks. To carry them out, it is seldom that the ships would be grouped as for battle action. Now and again, several ships of varying type will coalesce into a formidable group for special operations; often, they will operate singly or in couples.

The "pocket-battleship" of the type of the "Graf Spee" was believed by the Germans to be equally as revolutionary in sea fighting as many Nazi conceptions have proved in land fighting. She was considered able to sink any ship from which she could not run away; her 11-in. guns, it was calculated, would overpower anything afloat except capital ships with bigger guns, and her speed would enable her to keep out of range of such big and heavily armoured vessels.

Britain's naval experts took due note of this newcomer among types of warships. In addition to the "County" class of cruisers already laid down there was also scheduled, in 1929, a class of faster, nimbler cruisers. They had smaller guns than the "County" class, but double the rate of fire, and they had splendid powers of manoeuvre. When the "Graf Spee" was finally located, the "County" class cruiser H.M.S. "Exeter" went into action against her, accompanied by two of the "Leander" class cruisers, H.M.S. "Ajax" and H.M.N.Z.S. "Achilles."

H.M.S. "Exeter" was partially disabled in the running fight which ensued, and her smaller sisters hung on grimly to the fleeing Nazi battleship. The German vessel was so badly disabled that she was unable to leave Montevideo harbour and meet the three British warships outside. She was scuttled on the direct orders of Hitler, and her commander committed suicide. The action against the "Graf Spee" demonstrates the quality of

that courage, based on skill, confidence and sheer daring of spirit which is peculiarly the heritage of the Royal Navy. Each of those three British cruisers could theoretically have been sunk by the "Graf Spee's" bigger guns, while the Nazi ship remained beyond the range of the British 8-in. and 6-in. guns. The British relied on their seamanship, and on the moral effect of unhesitating attack. They raced within range of the "Graf Spee." They hemmed her in, as hunting wolves close in on the flanks of a dangerous boar; they ran her down; she was battered to defeat by

their pace, superb gunnery and manœuvre. Typically, the Germans still refer to this action as a German "victory"!

The Royal Navy's actions against the Italians steadily diminished the sea-power of that ally of Germany, whose naval forces were expected to challenge British supremacy on the inland sea. Although for a long time the British Mediterranean Fleet was numerically inferior to the force disposed by Italy, the balance was turned to Britain's favour by the shattering attacks made upon an enemy who consistently tried to avoid coming to action.

(Continued on page 35)

DESTROYERS IN THE MEDITERRANEAN . . .

The inland waters are not always the "wine-dark sea"; often they run high. The destroyers make the best of whatever weather is going as they pursue their manifold tasks.





**"A SEA-WAR FOUGHT AS NELSON
WOULD HAVE FOUGHT IT"**

From the beginning, and despite the loss of the French Fleet and French bases, and the entry of Italy into the war, the British Navy dominated the Mediterranean Sea.

1. Heavy bombardments of shore positions by units of the battle-fleet have deposited upon Axis ports, docks

and harbours a great weight of directed and penetrative high-explosive.

2. Taranto . . . daring attack by torpedo-carrying bombers launched from aircraft carriers crippled a large part of the Italian battle-fleet strength in what was considered to be its chief stronghold, within the "heel" of Italy. The aircraft carriers withdrew safely from the action.
3. The Battle of Cape Matapan, when Italian naval

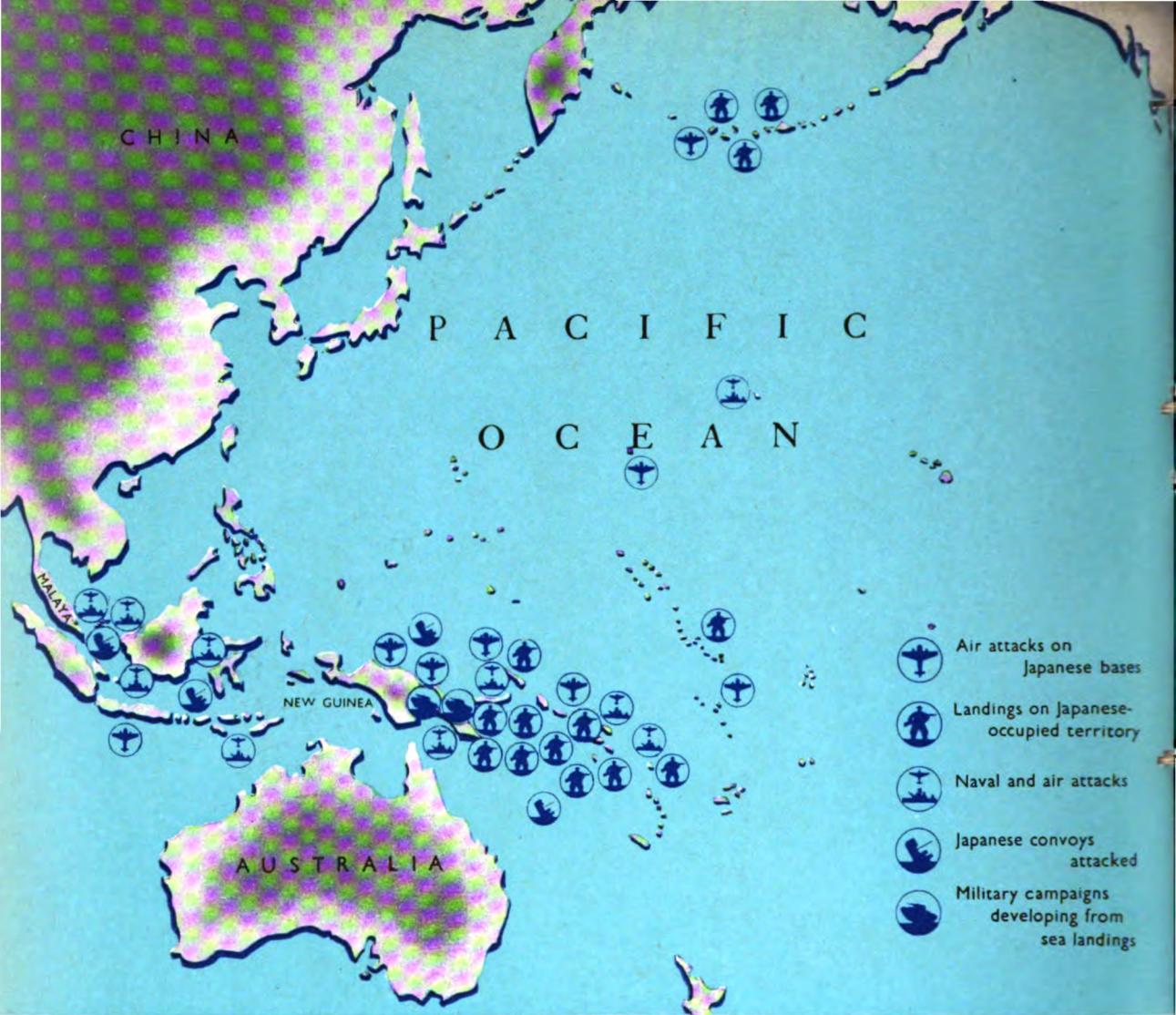


forces, including battleships, were challenged by a British battle squadron which steamed for 30 hours to meet them. The Italians ran for home, losing several cruisers and destroyers. Not a ship of the Royal Navy was scratched.

4. From port to port along the long North African coastline, from Alexandria to Sousse, the Navy supplied the desert armies which drove the German Afrika Korps into the tip of Tunisia.

5. Landings were made possible by sea-power at various points along the North African coast as British-U.S.-French forces moved in to begin the grand offensive against the Axis-in-Africa.

6. Malta, the island base of sea-and-air power, spring-board for the invasion of the Italian mainland by sea-borne forces. Sea-power made possible its provisioning and reinforcement in the face of tremendous enemy assaults from the air.



**ALLIED SEA-POWER HAS TAKEN THE OFFENSIVE ALREADY
IN THE PACIFIC**

Every attempt of the Japanese to confirm the security of their "outer ring" of defence against the coming retaliation of the Allies will be ruthlessly contested. There shall be no security for Japan. She shall be hit, again and again; her outposts crushed; her reinforcements sunk; her air-fleets beaten from the sky. Sea-power will close in upon the Japanese mainland, invincible and inexorable.

1. Midway Island. A Japanese concentration of warships and aircraft was intercepted, attacked, damaged and dispersed.

2. Coral Sea. A Japanese fleet with battleships and aircraft carriers accompanying troopships and supply-ships was crushingly defeated.
3. Guadalcanal. Japanese occupation was terminated by an invasion of United States forces which cleared the area, capturing and killing many thousands of the enemy.
4. Japanese convoys over the vast area of the Pacific Ocean have been searched for, found and struck by aircraft . . . one convoy of an entire division was completely destroyed.

The Italians apparently preferred to await Germany's "removal" of the British battle squadrons by air attack.

The war in the Mediterranean was a sea-war fought as Nelson would have fought it. It was the proper application of sea-power in relation to land-power. The enemy's sea-communications were interrupted and his "inner circle" of sea-borne traffic—along the bights and bays of the Adriatic, around the Greek islands in the Aegean, to and from his African territory—was harried and sunk. The whole conception of naval strategy carried out from Gibraltar to Port Said had the authentic Nelsonian blend of audacity and sagacity, of daring action combined with sure knowledge of the wasting effect, upon the enemy's material power and his morale, of long-term blockade.

The Mediterranean Fleet convoyed immense stores of war material and thousands of troops to Cairo. It kept General Montgomery's magnificent forces supplied at all the stages of the astonishing desert advance of the Eighth Army when these things were all-important for victory. It maintained the island fortress of Malta as a festering sore in the Axis line of communication to Africa.

And at the same time, the Mediterranean Fleet swept the inland sea from end to end, seeking battle against what was originally a numerically stronger Italian Navy based on its home ports.

The clear triumph of sea-power in these waters was demonstrated when, after three years of Nelsonian warfare, the island fortress of Malta and the immemorial Rock of Gibraltar witnessed the surrender of the Italian naval units after the defeat of Italy and her elimination from the world-struggle as a partner in the Axis conspiracy.

Thus the sterling work of the Royal Navy was carried on, week after week, while the balance and versatility of the sea-arm was

demonstrated in aggressive action whenever and wherever it was able to achieve contact with a fearful and hesitant enemy.

The huge zone of the Pacific Ocean wastes is drawn into the area of sea-power's conflict by Japan's aggression. Japan had early successes in securing by swift and treacherous assault the overseas bases in Malaya, the Dutch East Indies, Java and the South Sea Islands. The successes (themselves due to sea-power, in the absence of effective opposition because of British preoccupation with Germany, and United States neutrality in that phase of the struggle) greatly extended the scope of Japanese sea-power. The Japanese used ruthless air-power in support of their ship-borne invasions. They may well have hoped, in the first flush of success, that these conquests could be extended to include all that Greater Asia over which they claim dominion. If so, they reckoned without the sea-power which confronts them, ready to do battle for every square yard of the Pacific Ocean.

Allied sea-power has taken the offensive already in the Pacific. A Japanese fleet moving over the Coral Sea, with battleships and aircraft carriers attending troopships and supply vessels, was harried and hit, bombed and bombarded by United States air and naval units; crushingly defeated, it turned and fled. In June 1942 another great concentration of Japanese warships and aircraft off Midway Island was intercepted, attacked, damaged and dispersed. United States invasion forces, brought into action by sea-power, recaptured the island base of Guadalcanal, in the Solomon Islands, which in Japanese possession threatened sea-communications between Australia and America. Tens of thousands of Japanese corpses in the arms of the long Pacific swell, thousands more rotting in the New Guinea jungles, bear witness to Allied sea-power's amphibian force: for only sea-power could supply and garrison the distant overseas



SHATTERED BY SHELL-FIRE AND TORPEDOES, battered by ceaseless onslaught after 1,750 miles of punishing pursuit, the powerful German battleship "Bismarck" flames to her end. . . .



HUNTED, HOUNDED, AND HIT by British cruisers inferior to her in armour and gun-power, the German pocket-battleship "Graf Spee" is blown up in neutral waters by orders of the German Führer.



A BATTLE-ACTION UNIQUE IN NAVAL HISTORY for the destruction inflicted on the enemy without loss by the attacking ships. Matapan —where one aircraft only was lost and many Italian ships sunk and damaged. Here cruisers are drawing the Italian ships towards the British battle-fleet.



AFTER A THREE-DAY SEA-AND-AIR BATTLE at Midway Island, strong Japanese naval forces were routed and largely destroyed. Here, a Japanese "heavy" cruiser lies listing and ablaze after bomb-attack by United States naval aircraft from an aircraft carrier.

bases from which Australian and United States forces thus launched the counter-attacks which have begun to bite off the far-flung tentacles of Japanese aggression.

Early in March 1943 a seaborne Japanese expedition off the coast of New Guinea, consisting of 10 warships and 12 transports, with launches and barges, conveying an entire division, was completely destroyed by 136 Allied aircraft which dropped 226 tons of bombs, leaving not one ship afloat, not one Japanese alive. In this Pacific action, 150 Japanese defending aircraft were encountered, some while refuelling on the ground at Lae ; 102 of these were put out of action, 63 were confirmed as destroyed. Only one Allied heavy bomber and three Allied fighters were lost. This gives the measure of Allied combat superiority.

The whole scene of the present naval conflict took on a more sombre and significant aspect with the sudden breaking forth of Japanese aggression in response to the dictates of Berlin. The world's three major naval Powers now battle for the control of the world's sea-ways. The Allied navies have a preponderance of strength over the Axis, but they have also an immensely extended field of operations. Set-backs, losses and the mounting strain of a long struggle are bound to make themselves felt on both sides. Allied naval resources, however, also mightily exceed those of the Allies' enemies. Naval decision will be unflinchingly sought by the endeavour to bring the foe to action. And the even greater part to be played by the combined navies of Britain and the United States will be in the duties of their armed hosts of naval units purging and protecting the sea-routes, carrying on a grim and remorseless warfare against submarines and aircraft, maintaining convoy, blockade and reconnaissance.

An already dominant United States Navy in the Pacific has been mightily reinforced by the

shifting of the centre of British naval power from a point west of Suez to a point east of Suez, consequent upon the unconditional surrender of Italy and the transference of her battle-fleets to the Allied Nations. This was a double increase of the naval resources pitted against Japan and Germany, since not only was the Italian Navy taken over but the numerically stronger Mediterranean fleet of the British Navy was set free for operations in other zones of the global war.

Convoy to Russia has bulked very big in the necessary priorities allotted to the tasks of British sea-power. Second only to the unceasing Battle of the Atlantic (and only so because it is upon the maintenance of uninterrupted communication between the giant arsenals of the United States and the bridge-head of Britain that supplies to the Soviet battle-fronts finally depend) the through sea-route to Soviet Arctic ports has been kept fully open in the face of tremendous Nazi opposition. The Soviet ports are within the Arctic Circle, but they can be kept ice-free the whole year round ; the sea-lane to these ports is shrouded for several months of the year, for a great part of its distance, in the continuous Arctic night ; blizzards, snow and ice, fog and biting Arctic gales must be braved ; in addition to all these the Nazis concentrate in northern waters a violent pressure of attack by warship, submarine and aircraft against the vital Russian supply-route. That attack has been faced and very largely repulsed.

Convoy to the Middle East theatre of war, by the long sea-route round the Cape of Good Hope, has gone on persistently over many months, arming the forces of the United Nations which, based on Cairo, put into the desert battlefields an eventual weight of offensive metal able to drive the Nazi Afrika Korps and its Italian allies 1,700 miles back and out of Africa. The Axis forces in Africa were

supplied across a short sea-passage from Italy, to Tunisia, Bizerta and Tripoli, as well as to Benghazi, Sollum and Tobruk (when Field-Marshal Rommel's advance had encompassed those Mediterranean ports). The entire Italian Navy and Air Force and substantial forces of the German Luftwaffe were in operation to secure those short sea-routes, yet against British sea-and-air power in the Mediterranean they were not able to re-equip and replenish the Axis armies on a scale nearly sufficient to match the British Eighth Army, supplied across ten thousand miles of sea! Thus does the long arm of sea-power reach out across the globe to the succour and support of armies overseas which have its powerful aid.

Convoy to Malta has been continued uninterruptedly, through the thick of Axis concentration on communications between the airfields of Sicily and those of Tripolitania, and between the bases of Italian sea-power on the mainland and its overseas ports on the North African shore. British sea-and-air power, massed for the purpose, pushed the convoys through to Malta again and yet again, to maintain the island as a sea-and-air base, and to enable it in due course to turn from stubborn defence to punishing attack.

The total effect of the unceasing sea-war is very severely felt by the whole of the internal economy of enemy States. It is only for a limited period of time that such States can continue to endure it—however much they may succeed in extending that limit by development of substitute materials and by rapine of subject nations. They may postpone the

sentence of death—they cannot commute it to anything less than the extreme penalty.

In the Allied Nations' case, sea-power makes the very opposite true. The long war sees them mightier with every passing month. Sea-power and air-power fight off the threat to their supplies, and prohibit enemy invasion. And in the meantime, their striking power, originally less than Germany's because their peaceful intentions led them to allow the sword to rust in its scabbard, becomes vastly augmented.

Now the battle-fleets of Britain and the United States—the two greatest navies in the world, and capable of an enormous expansion despite the utmost that the Axis can achieve—sail and fight together on a common front, upon the seas of all the world.

British sea supremacy, her ancient, inviolable defence, will be maintained against all comers. It has proved itself a sure shield. It has met and matched the worst that Britain's enemies can do to mitigate or to end its historic roles in war against the British Isles.

Britain's Royal Navy is 100 per cent. mechanised and 100 per cent. mobile. It constitutes an object-lesson in the force and power of mobile, mechanised armaments. The new and greater Royal Air Force which has grown up *behind sea-power's defences*, and the mechanised British Army which fights with it, joined to sea-power, and made effective by sea-power, will with their Allies end the Axis bid to dominate the world—a bid made with the crippling lack of secured world-communications which alone could have given it any hope of success.

V. THE AIR ABOVE THE SEAS

Air-power adds immensely more to the force of sea-power than it takes away

SEA-POWER DECIDES, now as ever before, not in a single spectacular campaign occupying a few days or weeks, but with relentless certainty as the months draw out into years.

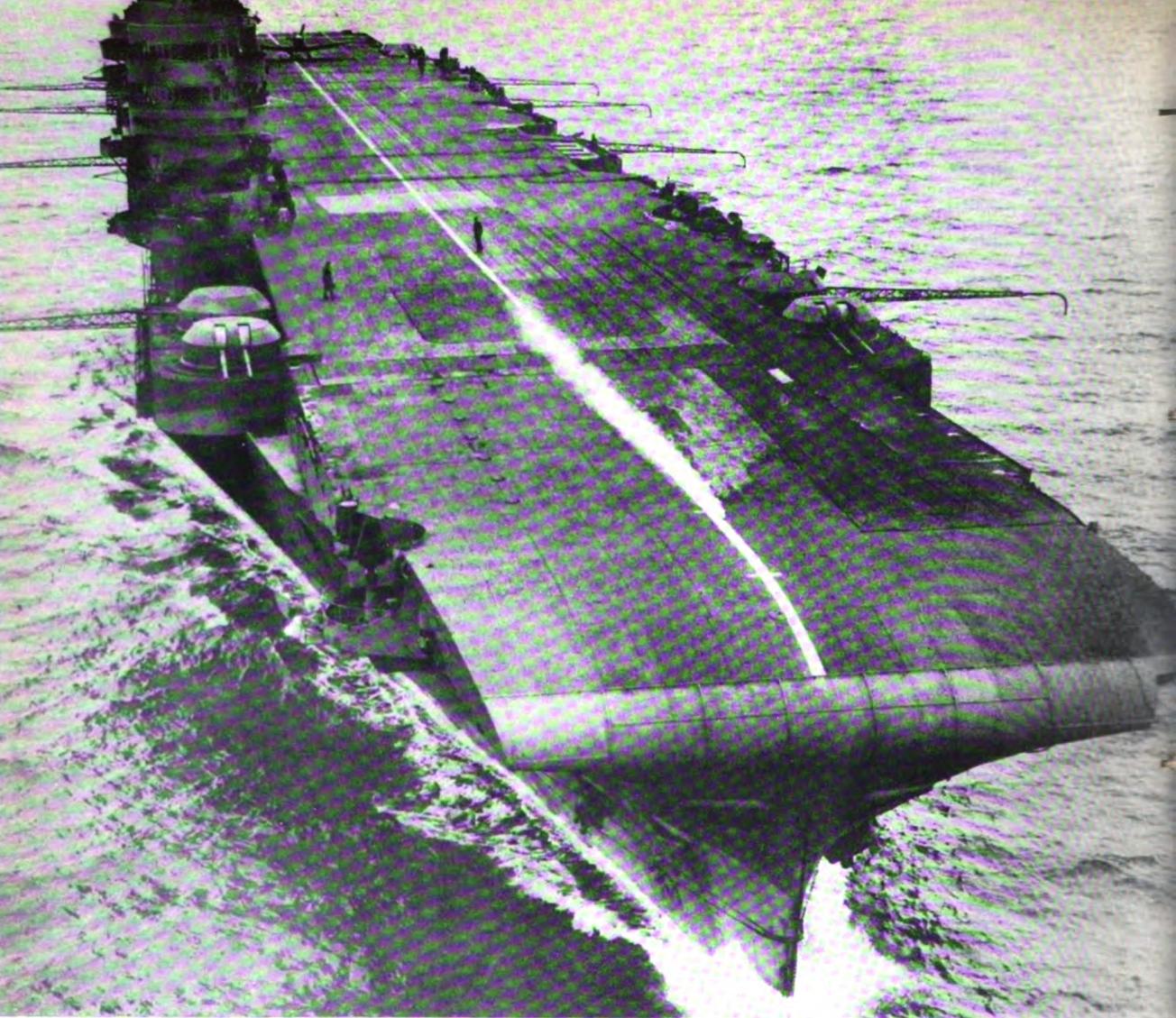
On the narrow waters surrounding Britain, in British estuaries, in the channels which divide England from Ireland, from France, from Germany's own sea-board, from Norway, the Royal Navy must toil night and day at the weary work of stamping out the menace of the U-boat and the shore-based air-raider. That work has been well and faithfully performed, and it will go on. It is supported by the unremitting efforts of Coastal Command of the Royal Air Force, which sends its patrols a thousand miles to the southward, to the western gateway of the Mediterranean, and a thousand miles to the north, to the fjords and inlets of the long Norwegian coastline. Submarines are hunted and exterminated. German losses have mounted steadily. British losses have diminished.

Upon the seven seas that link the continents, and upon the Atlantic Ocean especially, watch and ward is maintained in co-operation with the Atlantic Fleet of the United States, to meet and suppress the threat of the ocean-going U-boats, the occasional surface raiders and the long-range German bombers. This work, too, is succeeding, despite grievous losses. The Atlantic life-line to America continues to carry a vast volume of reinforcement to

British, American and Soviet striking power, to British and Soviet staying power.

It was an avowed German conviction, emphasised in German radio broadcasts, that the sea-power of Britain could be nullified by air-power. The Nazi bid for world domination was essentially based on its exploitation of new techniques of war. The Germans did not originate these techniques. They did not pioneer the tank, the aircraft or mechanical fire-power. It was, however, their application of these to modern war which gained them all their early successes. As they constructed tanks and weapons in secret factories during seven years of preparation, so they built and stored an immense air armada. Adolf Hitler had studied the wars of the past. His reassuring words to the German people were to the effect that, this time, he would avoid both a war on two fronts and blockade of Germany. These factors obsessed German opinion as being decisive in their contribution to the German defeat of 1918.

In surveying every factor in European wars of the past, German military opinion has always paid due heed to the role of sea-power in curbing European conquerors: Philip II of Spain, Louis XIV and Napoleon of France, each of these dominated the land frontiers of the Europe of his day; each of these was defied by Britain; Britain emerged stronger and more prosperous at the end of each of the



A FLOATING AIRFIELD WHICH CAN OPERATE IN THE REMOTE DISTANCES OF "OCEAN-SPACE" AND BRING BOMBING AND FIGHTING AIRCRAFT INTO ACTION IN A SEA-WAR . . . A BRITISH AIRCRAFT CARRIER AT SEA.

The Royal Navy and the United States Navy have more than five times as many aircraft carriers as have the combined Axis navies; their rate of building and launching these great vessels is also far higher than that of the Axis. The aircraft carrier establishes air-power upon the high seas. It brings specialised types of bombing, torpedo-carrying, reconnaissance, patrolling and fighting aircraft into action thousands of miles from shore-bases—and also provides covering aircraft for naval units operating, alone or in conjunction with land forces, in near-shore waters.

One of the most striking achievements in the air-war was the bombing of Tokyo, capital of Japan, which after the Japanese attacks on Pearl Harbour and Singapore, was considered invulnerable to air attack. The bombers' "base" was a United States Navy aircraft carrier in the Pacific Ocean referred to as "Shangri-la." After bombing military targets in Japan, the aircraft landed on the mainland of Asia. Aircraft carriers in increasing numbers will play an increasingly important part in enabling sea-power to bring total war to bear against Japan.

long struggles she waged against them. Against the encirclement of British sea-power, it seemed, continental hegemony sought in vain to reap the rewards of conquest because Europe's conqueror could never enjoy his gains in peace! Sea-power denied peace, even to an oppressor who had subjugated all armed resistance which his armies could meet! Trade and expansion overseas (historically the very life-blood of European progress) were utterly denied him.

Control over sea-communications means life or death to the Europe of to-day, just as it did to the Europe of the past. Hitler knows this.

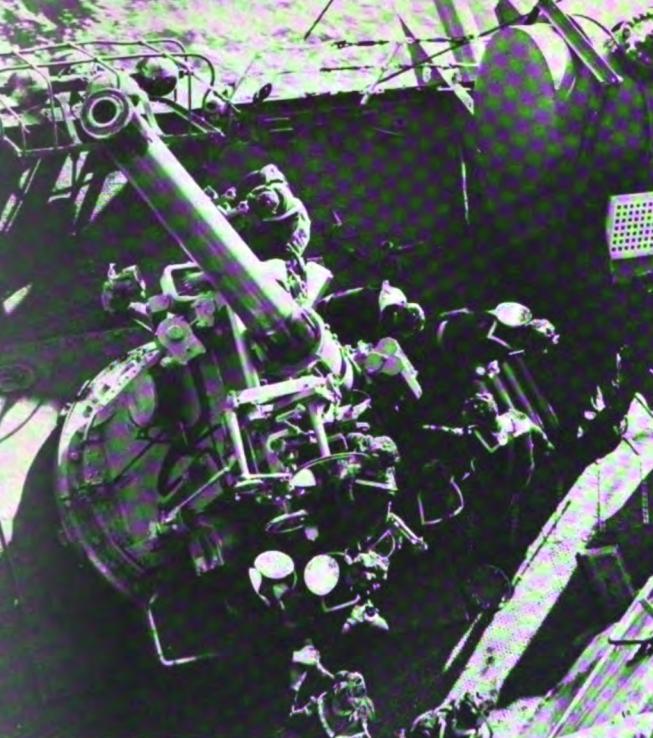
So far his armies have fought continental battles. It is only as the latest phase of Hitler-war that he has to make good his continental conquests by meeting and beating Allied air-power, which has now become immensely stronger than Germany's. (It has always been superior in the quality of its machines and the skill of its airmen.) Air-power, operating with sea-power, will continue to strike such blows at Germany that she will be hard put to it to survive. Whenever and wherever the Germans go outside Europe, they will be forced to fight under much more nearly equal conditions than they ever like, or ever plan. They will meet their enemies on level terms. Behind them sea-power will sap their communications, while Allied air-power will continue to carry a full-scale offensive against the basic source of their war-making power on the continent of Europe.

Hitler could not compete with British sea-power. He sought another means to destroy it and to avert its strangling force. That means was originally ready to his hand in the newly developed arm of air-power—a *land-based striking force* which he believed could reach, assail and disperse the flotillas of the British Royal Navy.

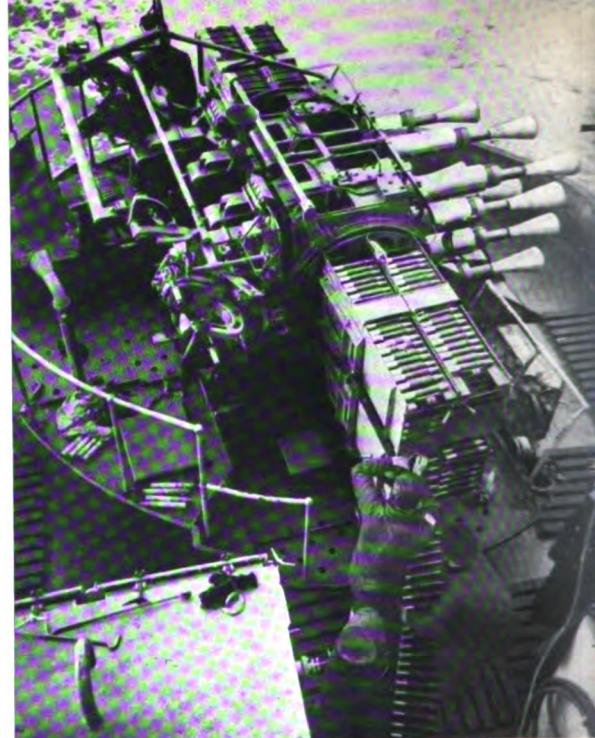
There must be a new development, a new technique of war, on the side of British sea-power, to counter the threat of German air-power and restore the historic superiority which it maintained over land-power. All the world knows now what that new development was. It was British air-power. British air-power proved decisively superior to German air-power in the Battle of Britain. That conflict erased from Hitler's programme the quick invasion and conquest of the British Isles and left him to face the long war, the war of attrition, the war of blockade—and eventually the war on two fronts.

But there was much more in the balance than merely the upsetting of Hitler's time-table. Not only was it conclusively demonstrated that, in her Royal Air Force, Britain possessed an instrument of war capable of blunting and beating the weapon of German air-power—it was also apparent that *sea-and-air power was as formidably superior to land-and-air power as sea-power, in the long run, had always proved to be superior to land-power.*

Air-power, to fulfil its role as the adversary of sea-power, must be regarded as a *land-based striking force* capable of crossing ocean-space. By its use, for example, Crete was conquered. This Mediterranean island was swamped by wave upon wave of airborne Nazi troops (many thousands of those who attempted a simultaneous sea-crossing were drowned by naval action—a greater death-roll in a single night than the total Allied losses in the whole campaign). Such footings *can* be gained by air-power, but at murderous cost. Their extension—from island to island, from foothold to foothold, becomes progressively more difficult, precisely because the *bases* of air-power (resting on the continent from which the attack was originally launched) cannot be advanced indefinitely. Against ships upon the sea this difficulty becomes greater still. Ships



Naval anti-aircraft gun with its crew.



Multiple machine-gun (anti-aircraft) on a British warship.

are based *originally* on ports, but by their nature they are able to establish their bases, for long periods, outside the operational range of shore-based aircraft, in the heart of ocean-space, and they do not remain in the same positions.

Thus it is that the *sea-bases* of air-power which ocean-going warships represent remain comparatively immune from attack by land-based air-power.

The big limitation, however, upon sea-power when faced with hostile air-power, is that air-power can force ships away from enemy-held coasts and make them operate at long distances. The sinking of two British capital ships by land-based Japanese bombers carrying heavy torpedoes during the Malaya campaign illustrates this difficulty of sea-power in

enforcing its will close to hostile shores. Similarly, at the battles of Midway Island and the Coral Sea, very heavy Japanese ship-losses were levied by Allied shore-based aircraft. Yet, in these latter actions, Allied ships also engaged the enemy, with far lighter losses than were suffered by the Japanese, and this gives the clue to the final Allied superiority which will be established in every theatre of war as a prelude to victory.

Sea-power, from its comparatively secure sea-bases in ocean-space, can launch devastating air-power both in attack and defence. The establishment of defensively secure operational bases has been shown to be a vital necessity of effective air-power. Sea-power establishes those bases not only by occupation and reinforcement of shore-positioning, but also at sea. When fully developed, this *sea-air* power

will allow of powerful naval units operating in near-shore engagements *under the protection of aircraft based far out at sea.*

The loss of the British capital ships off the coast of Malaya led to the loss of the British naval-base at Singapore. It is apparent that the onset of those battleships, with their tremendous, long-range, destructive artillery, upon the Japanese landings, would probably have saved Singapore. These capital ships accepted a big risk for a big stake, and they lost. They went into action without air-support, trusting to cloud conditions to screen them from Japanese aircraft. A similar operation, carried out *with* protective air-escort, blasted Japanese invasion forces in the Solomon Islands area of the Pacific. It is a feature of the war in the Pacific that engagements at sea between the Japanese and the navies allied

against them develop as *air-sea* battles. This is symptomatic of the future of all sea-operations in the vicinity of enemy-held shores. It is the conclusive solution to the problem posed for sea-power by Hitler's attempt first to establish a European hegemony, and then, while securely based on the European land-mass, to assault the world, with his air-forces operating in place of and against sea-forces.

Such a bid pits *land-air* power against *sea-air* power, and hard experience shows us that that equation is identical with *sea-power* against *land-power*—very much as if the two *air-power* factors cancel each other out. In reality, they do not quite cancel out. The varying and complex features, at some of which we have glanced already, which give *sea-power* its superiority in the long run over

Royal Australian Navy gunners man an anti-aircraft gun.





A fast naval fighter diving to attack.

land-power (in a truly global conflict) seem likely to give sea-air power an added superiority over land-air power.

There have been numerous attacks on naval units from the air during this war. The Japanese attack off Malaya, cited above, represented *land-power* and *air-power* (land-based) versus *sea-power* alone; but tremendous concentrations of German land-based *air-power* against British *sea-air power*, by mass attacks on convoys to Malta which were protected by naval units and aircraft carriers, have been decisively repulsed. One of these engagements demands special notice, though its implications have been obscured in news-interest by subsequent bigger operations; 150 German

dive-bombers, shore-based within a few miles' distance, attacked a British aircraft carrier for seven continuous hours—90 were destroyed (50 in the air and 40 by bombing attacks at their base). The aircraft carrier made harbour safely. The convoy she escorted was unharmed and, although a British cruiser was lost, approximately £1,000,000 worth of aircraft perished "in exchange." Here is an example of the power of seaborne anti-aircraft fire and fighter-bomber protection to guard a floating naval *air-base*. Such a base, located in ocean-space from the depths of which its aircraft could find fixed targets ashore but which (itself a *moving* target) might never be found by retaliating shore-based aircraft, has an obvious superiority.

The large number of air attacks on Allied ships has given the Axis a relatively small return in sinkings, and there have been a number of striking failures of bomb-attacks, leading to the view that the *airborne torpedo* is the most effective air-weapon against ships.

Contrarily, the Allied navies have secured a rich return from air attack on Axis ships. This contrast is basically due to the convincing superiority of *sea-air-land* power over either *sea-air* power or *land-air* power. This superiority is the natural prerogative of Allied sea-power's vastly greater strength and resources over that of total Axis sea-power. It is the key to the Allied Nations' world-strategy. Wherever and whenever the greater man-power, greater machine-power, greater

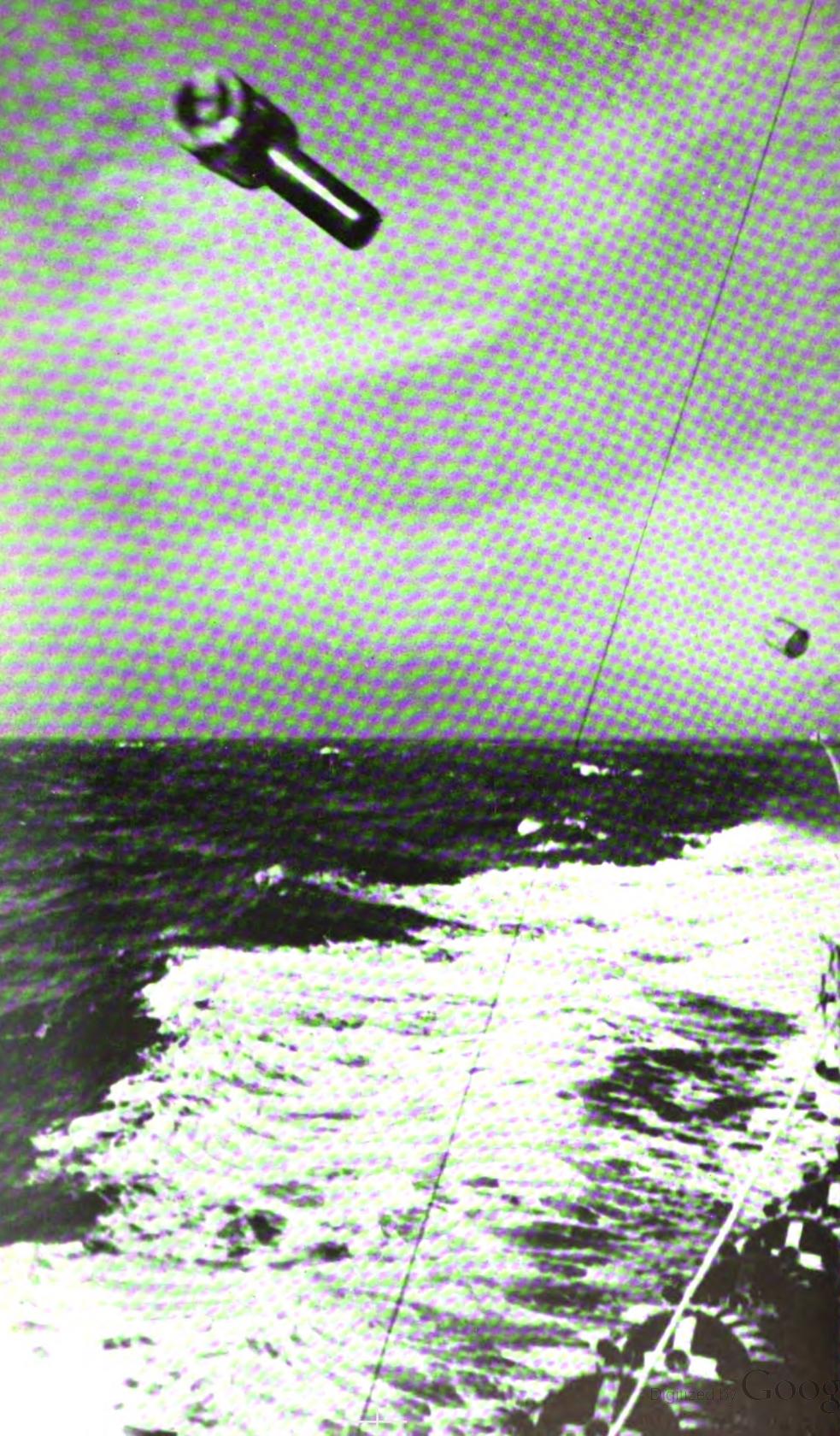
material power and greater food resources of the Allied Nations assemble a greater striking power of men, tanks, guns, aircraft and supply—the Allied Nations' greater sea-power and greater sea-air power will turn it to effect.

The decisive findings of an investigation of air-power as a counter to sea-power in world-war, must on the facts exhibited by contemporary sea-war, and on the developing trends which those facts disclose, be in favour of sea-power.

It is necessary next to examine the operation of under-sea attack (remembering that this is made far more formidable than ever before by complementary air-power) upon that control of the sea-routes of the world which is sea-power's greatest contribution to victory.

Powerful fighters preparing to take off from the flight-deck of an aircraft carrier.





“To blast from the sea the submarine by depth-charge overside, with only the spreading pools of oil to show that she had died.”

The deadly, explosive canister hurtles overside from a British warship, which is racing in a wide circle round the spot where an enemy submarine has been sighted, sowing depth-charges as she goes.

VI. BELOW THE SURFACE

The submarine menace, supported by air-power, is met and matched by surface- and air-control

IT IS an historic fact that German submarine attacks upon British shipping in the war of 1914-18 brought Britain at one stage to within six weeks of the end of her food stocks. The full weight of submarine warfare only developed in 1917. It was called "*unrestricted*," because it aimed to sink trans-ocean shipping of whatever nationality—on the logical assumption that British sea-power made it virtually certain that all shipping afloat, while it might be of help to Britain, could not be of help to Germany. The convoy system broke that threat to Allied supply. In the present war it was a German calculation, with very much in its favour, that full-scale submarine warfare would achieve a blockade of Britain. For this was to be submarine warfare aided by air reconnaissance, and to some extent by air attack on merchantmen in convoy as they neared home ports within the range of shore-based German bombers. This represents a formidable totality of attack upon the life-lines of the United Nations—those very life-lines which, by definition, it is sea-power's supreme function to preserve. It is an attack impinging on the sea-routes at their starting-point on the United States sea-board, on the whole field of the North Atlantic Ocean, and on the narrow waters of the European coast where shipping is again concentrated and therefore open to continuous bombardment from the air. It is

an attack justly calculated to impair sea-power by stultifying its very performance.

Against that calculation by Germany it is best, first of all, to set the known facts. If an ounce of practice is better than a ton of theory, a candid review of the *submarine-plus-air* campaign *in action* throughout more than four hard years of war is, immediately, better than reasons why that campaign has failed, and must fail. *The detailed facts, however, on submarine warfare are something an active enemy, planning his long-term and short-term operations below the waves and in the air, would dearly like to know. For it is in the very nature of the submarine's secret work that her commander can only record results by guesswork, and can only report them in person.*

Results need not be detailed, however, to be convincing. Totals are fully as telling as the units of which they are the sum. For what is being examined here is the extent to which *submarine-air* action has destroyed Allied control of sea-communications, the foundation of Allied victory. Here is Winston Churchill's summing-up of that exact situation on February 12th, 1943 :—

“ The United States has vast oceans to cross in order to close with her enemies. We also have seas or oceans to cross in the first instance, and then for both of us



On a giant wall-map at the battle headquarters of Coastal Command are marked the hour-by-hour positions of all aircraft at sea upon their duties of reconnaissance, patrol, escort and attack.

there is the daring, complicated enterprise of landing on defended coasts and also the building up of all the supplies and communications necessary for vigorous campaigning when once a landing has been made. It is because of this that the U-boat warfare takes the first place in our thoughts. There is no need to exaggerate the danger of the U-boats or to worry our merchant seamen by harping upon it unduly, because the British and American Governments have known for some time past that there were these U-boats about and have given the task of overcoming them the first priority in all their plans. . . .

“ Progress is being made in the war against the U-boats. We are holding our own, and more than holding our own. It is, in my opinion, desirable to leave the enemy guessing at our real figures, to let him be the victim of his own lies, and to deprive him of every means of checking the exaggerations of his U-boat captains or of associating particular losses with particular forms and occasions of attack. . . .

“ However, I may say that in the last six months, which included some of those heavy operations which I have mentioned, the Anglo-American and the important Canadian new building all taken together

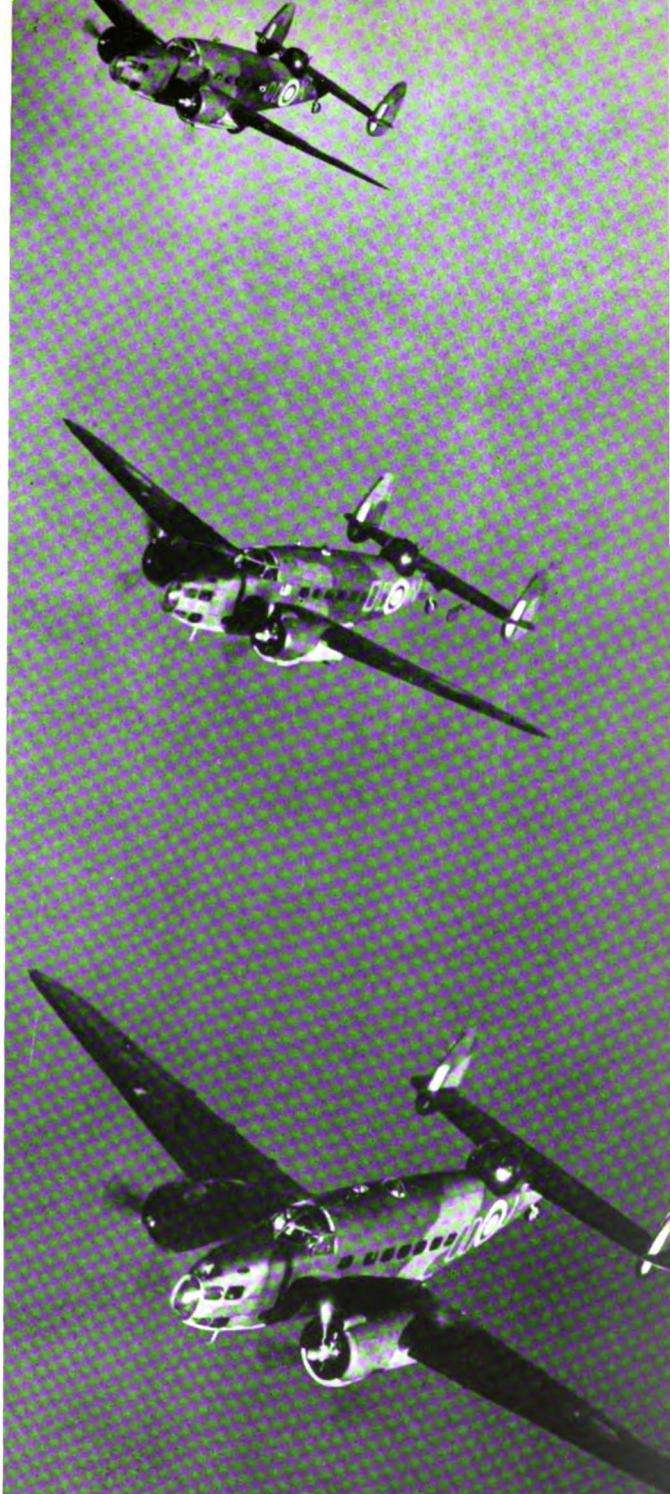
exceeded all the losses of the United Nations by over 1,250,000 tons ; that is to say, our joint fleet is 1,250,000 tons bigger to-day than it was six months ago. . . .

“ But the statement by no means does justice to the achievement of the two countries, because the great American flow of shipbuilding is leaping up month by month, and the losses in the last two months are the lowest sustained for over a year. The number of U-boats is increasing, but so are their losses, and so also are the means of attacking them and protecting the convoys. . . .

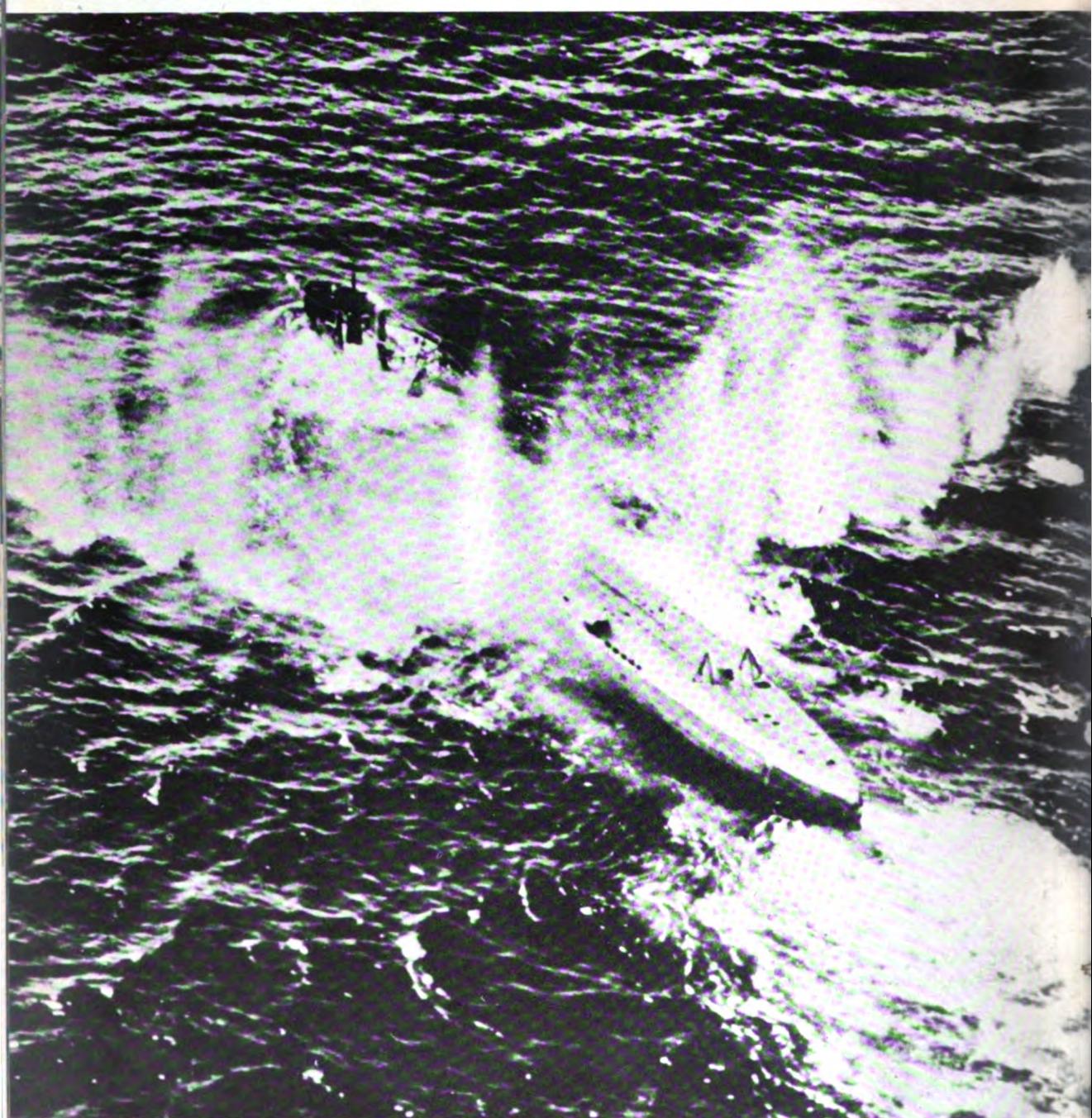
“ Nothing is more clearly proved than that well-escorted convoys, especially when protected by long-distance aircraft, beat the U-boats. I do not say that they are a complete protection, but they are an enormous mitigation. . . .

“ On the offensive side in the U-boat warfare the rate of killing of U-boats has steadily improved. From January to October 1942 inclusive, a period of ten months, the rate of sinkings, certain and probable, was the best we had seen so far in this war, but from November to the present day, a period of three months, that rate has improved more than half as much again. At the same time, the destructive power of the U-boat has undergone a steady diminution since the beginning of the war. In the first year each operational U-boat that was at work accounted for an average of 19 ships ; in the second year for an average of 12, and in the third year for an average of seven and a half.”

There, in broad outline, is the factual rebuttal of that German calculation. The lesson of 1917 was as well learned by Britain’s Royal Navy and by the United States Navy as



Coastal Command bombers flying the sea-lanes.



Caught by a long-range patrol flying boat, a German submarine in the Bay of Biscay wilts under a hail of fire.

it was by Hitler. Once again the new factor of air-power in relation to sea-power adds something to both sides of the equation, and once again it adds more to the side of sea-power. It is reasonable to ask why air-power helps defence against submarine attack more than it helps submarine attack, and why it helps defence against near-shore air attack more than it helps that air attack. For in the case of air-power versus sea-air power, it is *sea-bases* plus ships which beat *land-bases*. In the case of submarines, this is no longer the case. It might seem that land-based air attack on shipping which is *pursuing known near-shore routes* should have an advantage over defence, and that submarine attack (aided by land-air reconnaissance) in the ocean-space should have an advantage over deep-sea shipping.

The answer calls for a brief consideration of the forces involved. A *submarine* is a warship with a low surface speed and an even lower below-water speed. She is extremely vulnerable to attack by bomb and depth-charge (a powerful under-water explosive which sets up intolerable water pressures, causing plates to spring open), and she has not the speed to escape when located by *aircraft*, *destroyers* (originally known as *torpedo-boat-destroyers* : fast, shallow in draught, armed with torpedo-tubes, depth charges and guns) or *frigates* (a new type of anti-submarine escort vessel). A submarine's offensive power resides in the secrecy shrouding her approach, and this power of hiding is her best defence. *Once her attack is launched, her secrecy is compromised.* Because of this, submarine attack against convoys is organised in "packs." The mass attack is calculated to score heavier sinkings, and to give greater chances of escape. Air-power is necessary for this technique, for only long-range shore-based aircraft is able to congregate by radio communication the submarine forces (which have limited visibility on

the surface, and severely restricted visibility when submerged and therefore safe) against the fleets of merchantmen.

Long-range air patrols from the shores of Britain, Canada, the United States, Greenland and Iceland, equally as well able as are the Nazi machines to reconnoitre the ocean-space, have the advantage of knowing in advance the routes of the convoys. They can concentrate their flying hours into active, continuous hunt for enemy submarines, while Nazi aircraft must quarter immense tracts of ocean in conditions of poor visibility, in order to locate convoys.

Convoys also have air escort. Escort aircraft carriers loose fast fighter aircraft to shoot down the slower machines used for the enemy's long-range reconnaissance. Even before escort carriers came into service, catapulted aircraft scored many successes against German spotting aircraft. The fighter pilots parachuted into the sea and were picked up by ships' boats after the destruction of the enemy raider—submarine's "eyes." Because of their vulnerability, submarines dare surface only at night, then recharging their electric accumulators for under-sea motive power, renewing their air-supply and getting into wireless touch with the "spotting" aircraft which alone enables them to intercept convoys. When such a "spotter" is shot down in daylight, there is an entire submarine pack deprived of its essential intelligence.

The Allied sea-air operations which combine to effect sea-power's answer to the challenge of the submarine, however, are on a far vaster scale than that so far indicated. They include a tremendous onslaught on submarine bases, docks and building yards, the systematic plastering of Hitler's Channel ports and airfields, and their lines of communication and supply ; blockade of submarine exits by mine and bomb, and the rescue work which brings in precious lives

adrift on the bosom of the deep after ships have been lost. All this aggregates, together with active submarine-hunting and aircraft-destruction over millions of square miles of the North Atlantic Ocean, into a powerful antidote to the submarine menace.

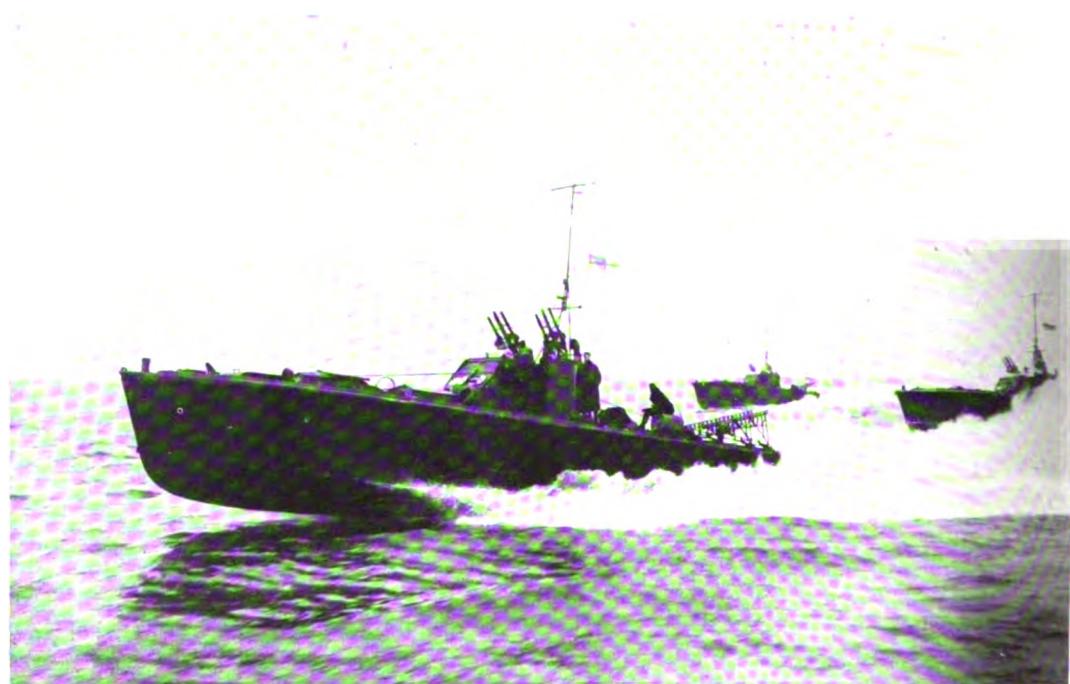
In this way, air-power adds far more to protection of shipping from the submarine than the submarine campaign gains from air reconnaissance.

The other arm which is concerned in these questions is the shore-based enemy bomber, attacking convoys nearer to their ports of destination. Here it is principally land-based Allied air-power which answers so emphatically in favour of the ships. Merchantmen and their escorts put up devastating anti-aircraft fire, and balloon barrages prevent dive-bombing, but the nearer they are to France and the Nazi bombers, the

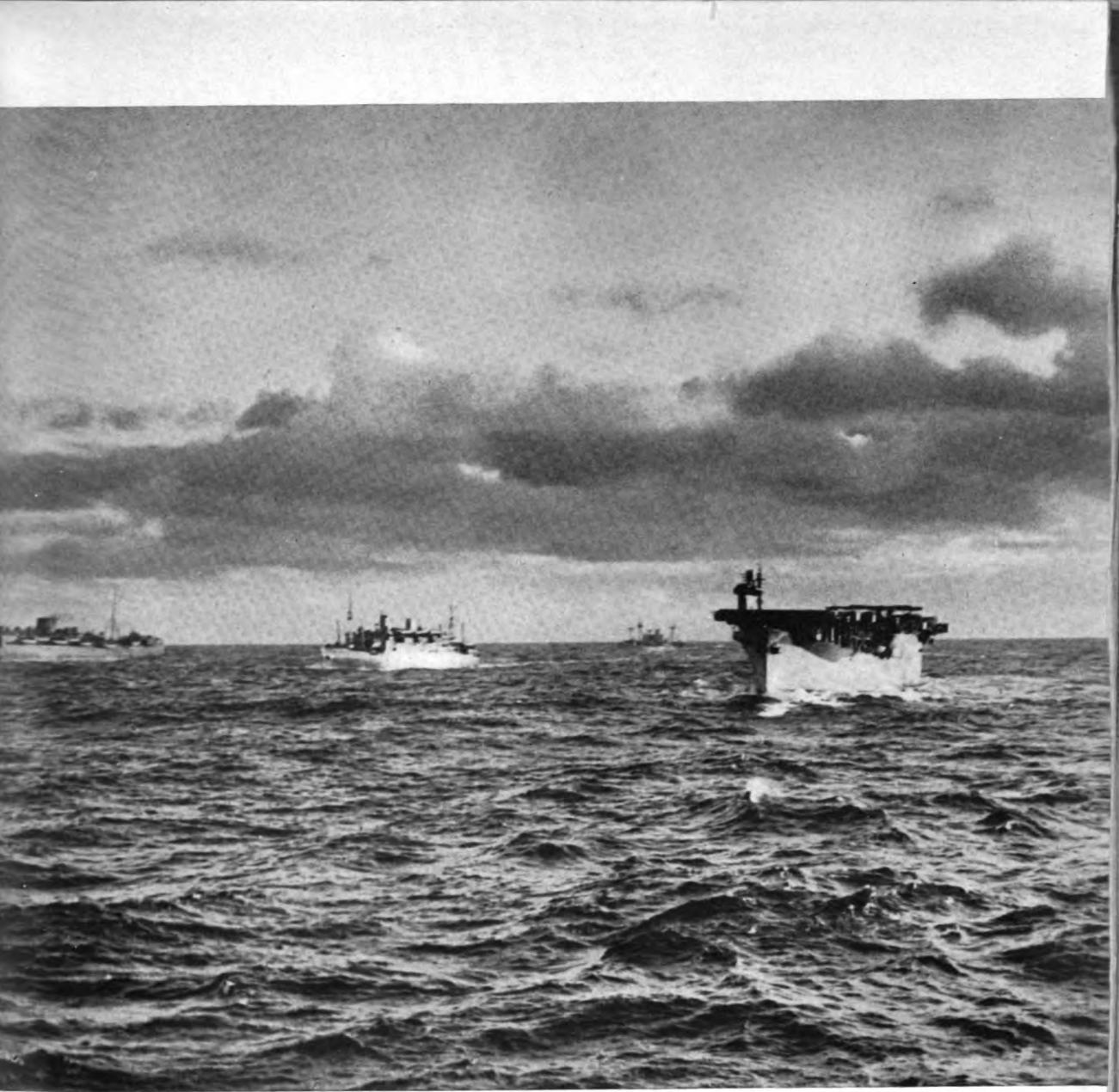
nearer still they are to England and the British fighters. The greater the concentration of shipping in the narrow waters, the bigger the target—but the bigger, too, the land-based defensive air-power protecting that target.

In the narrow waters, the equation is more nearly *land-air* versus *land-air* than *land-air* versus *sea-air*, and the ability of Fighter Command and Coastal Command of Britain's Royal Air Force (the latter operating under Royal Navy control), and of the United States Army Air Force, to impose overwhelming defeat on the German Luftwaffe is testified to by a great mass of operational success.

Thus it is that both the submarine and the air-raider are decisively met and worsted by modern sea-power, which retains its supremacy upon the vital sea links between the embattled Allied Nations in their war against the Axis.



A motor patrol boat, heavily armed with anti-aircraft guns, patrols the coastal waters at high speed.



MERCHANTMEN in convoy are accompanied by warships and by escort aircraft carriers which can send up reconnaissance and fighter machines and so bring air-power into close co-operation with sea-power in the task of maintaining overseas communications.

VII. ALLIED SEA-POWER

The battle fleets, warships and merchantmen of the Allies far outnumber those of the Axis

THE ROYAL NAVY, the Dominion and Empire navies, and the United States Navy, with their Allies, dispose a great numerical superiority over the Axis of all the sea-going vessels which carry out the tasks of sea-power on the seas and oceans of the world. For every ton of displacement the Germans possess in the categories of *battleships*, *battle-cruisers* and *aircraft carriers*, Britain alone possesses over four tons of displacement. Britain has three *cruisers* for every German cruiser—four *destroyers* for every German destroyer. In the categories of the lesser ships: *sloops*, *frigates*, *corvettes*, *gunboats*, *minesweepers* and *minelayers*, and all the necessary, little-known ancillary vessels, the Royal Navy's hosts vastly exceed their enemies.

The United States naval forces, in every category, greatly exceed those of Japan.

Other units—French battleships, cruisers and other naval vessels sailing and fighting with the Allied Nations, and Dutch, Polish, Norwegian and Russian units—further augment Allied superiority. Units of the Italian fleet will enhance Allied superiority over the Axis still more.

Beyond this, Allied building, especially that of Canada, the United States and Britain, greatly exceeds the highest potential of Axis building—thus the disparity in numbers,

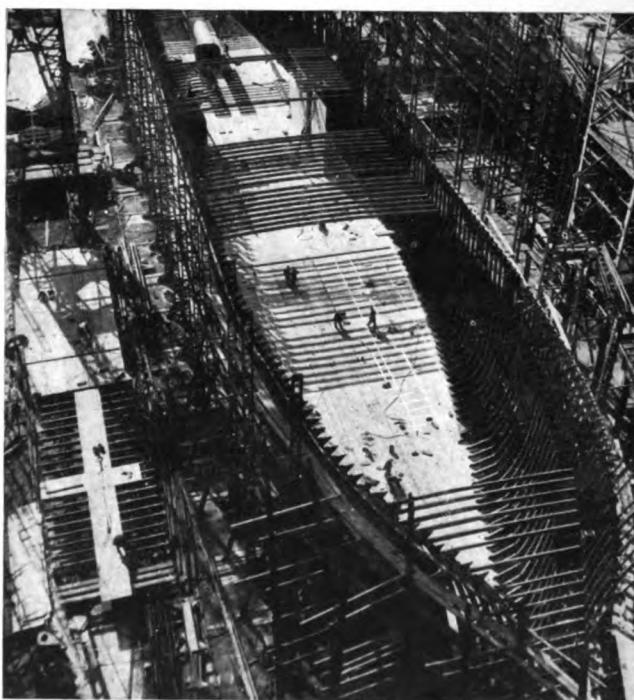
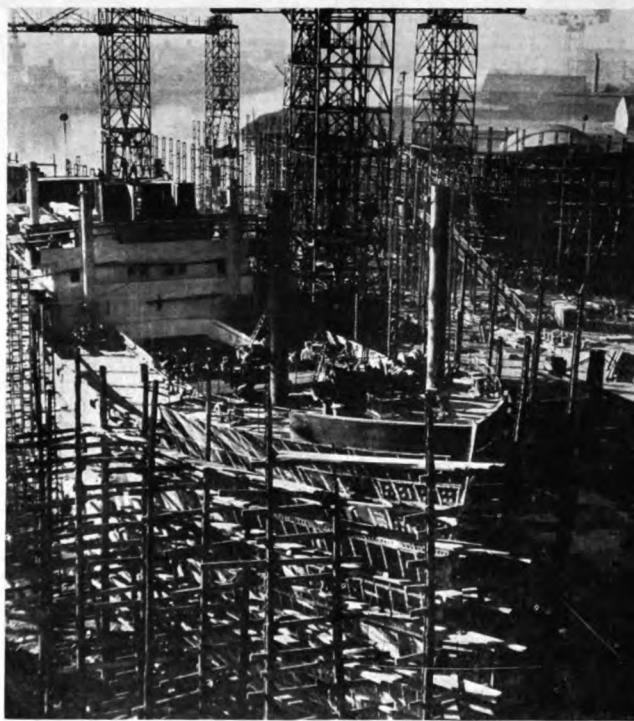
already weighted heavily against the Axis, continues to grow in favour of the Allied Nations with every passing month.

Against this, there is a formidable output of Axis submarine building—hampered by the Allied air-offensive against shipyards, docks, runways and bases, and cut down steadily by ruthless warfare at sea, but nevertheless continuing to put out upon the sea-lanes its hordes of under-sea offensive power.

"I may say that in the last six months (which included some of those heavy operations I have mentioned) the Anglo-American and the important Canadian new building exceeded all the losses of the United Nations by over a million and a quarter tons . . . the great American flow is leaping up month by month."

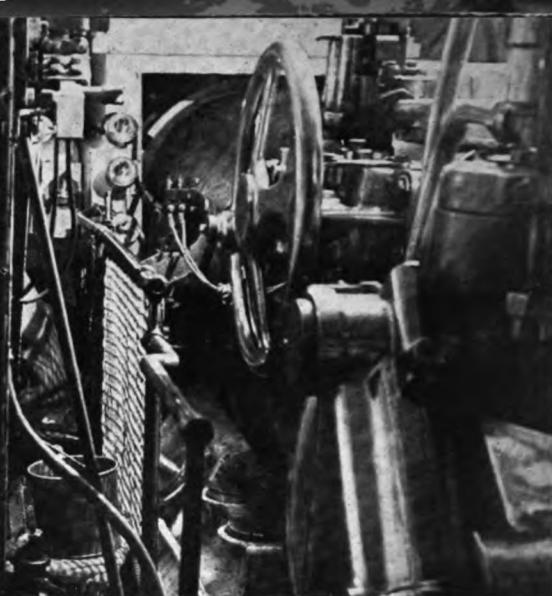
WINSTON CHURCHILL
to the House of Commons in February 1943.

This is the *balance of power* at sea, in the world-wide war. It is an emphatic assertion of the waxing strength of the sea-power of the Allied Nations against their persistent and still powerful enemies—agile in stratagems, thorough in organisation and backed by the enforced slave-labour of the entire Continent, and of Japanese-controlled territories which are *divided from that continent by sea-power alone*.





Above : Awaiting "Action Stations" in the 16-in.-gun turret of a British warship.



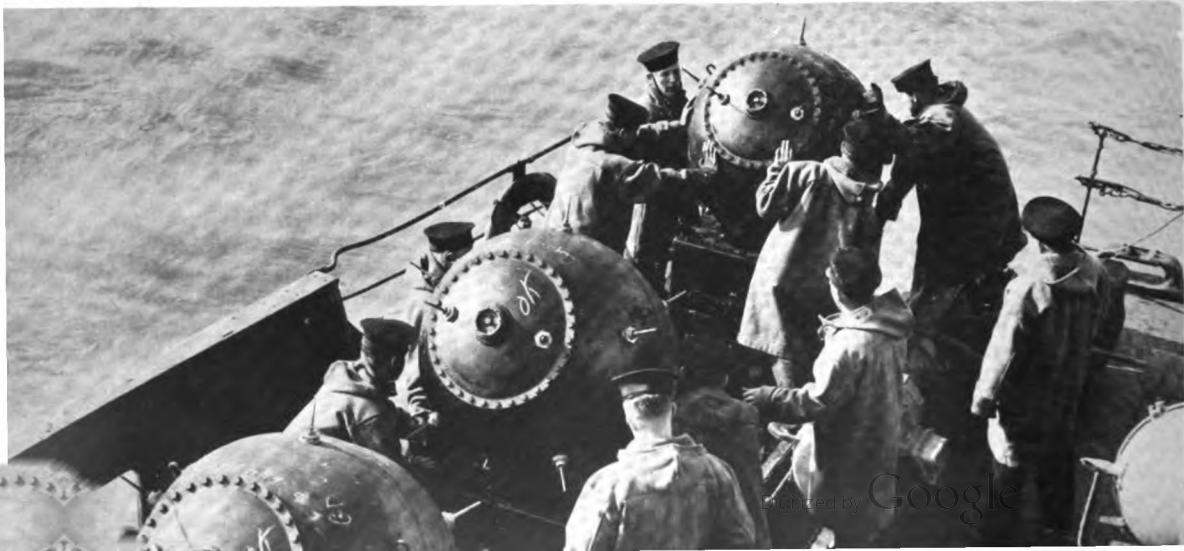
Below : The gun-layer at a 16.-in.-gun director.



Above : The breech of a big naval gun.



Below : Minelayer at work.



VIII. BY AIR, LAND AND SEA

Air-land-sea power is the modern legacy of sea-power alone, and must always defeat air-land power or air-sea power

TO SUM UP: Sea-power's control over sea-communications assures to the Allied Nations an increasing initiative in a world-wide war, due to their ability to use world-resources and deny them to the enemy; due to their power of movement and supply to every battle-front; due to their prevention of Axis junction; due to the overwhelming superiority under all conditions of their *air-land-sea* power over either *air-land* or *air-sea* power.

The only effective resistance to sea-power's modern offensive is that derived from air attack, from submarine attack, or from surface attack, upon the lines of communication which sea-power maintains. Sea-power's wide and fruitful use of air-power and its ability to give both to air-power and land-power their maximum striking force, overcomes such resistance. Germany, separated from Japan by sea-power, must be worsted in the conflict with sea-power. Japanese sea-power, hitherto reinforced principally by air-power, will later, perhaps, be reinforced by land-power, too, when the attack upon her mainland possessions begins. When that eventuality comes, Allied sea, land and air force will, however, be crushingly superior.

The total force of a combined assault by land, sea and air upon the mainland of Europe has been tested and proved. The result leaves no doubt of its efficacy. From North Africa, via Pantelleria, Malta and Sicily, the Italian peninsula was stormed and subjugated by the combined arms of naval, military and air legions acting in concert. Furthermore, at

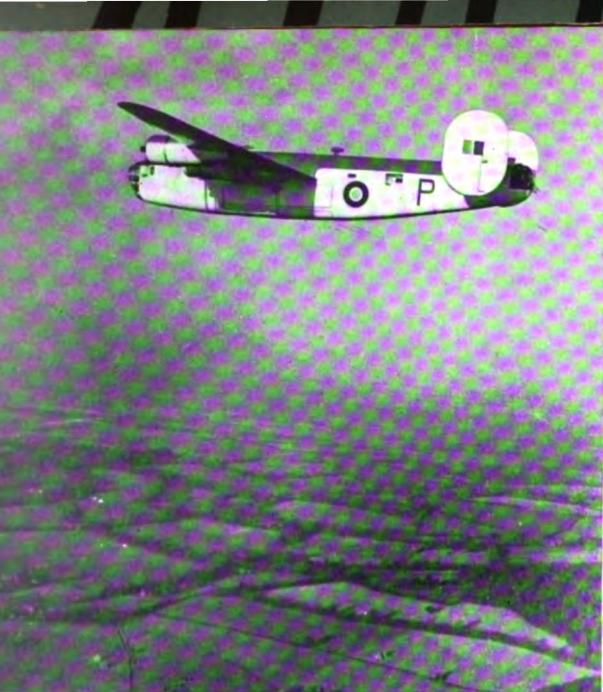
the height of the action off the beaches of Salerno, where the United States Fifth Army, strengthened by powerful British contingents, was fighting fiercely to maintain those footings on the mainland which sea-and-air power had secured for it, it was upon sea-power's "extra offensive" to some extent that the decision turned.

The German forces, with the advantages of the terrain on their side, entrenched strongly in dominating hill positions powerfully supported by mass fire-power, offered a serious threat to the United Nations' landings. The great guns of British battleships and the fire of cruisers and destroyers brought daringly inshore in defiance of German air attack, laid down an overwhelming barrage, accurately and destructively, which dislodged and disintegrated that threat.

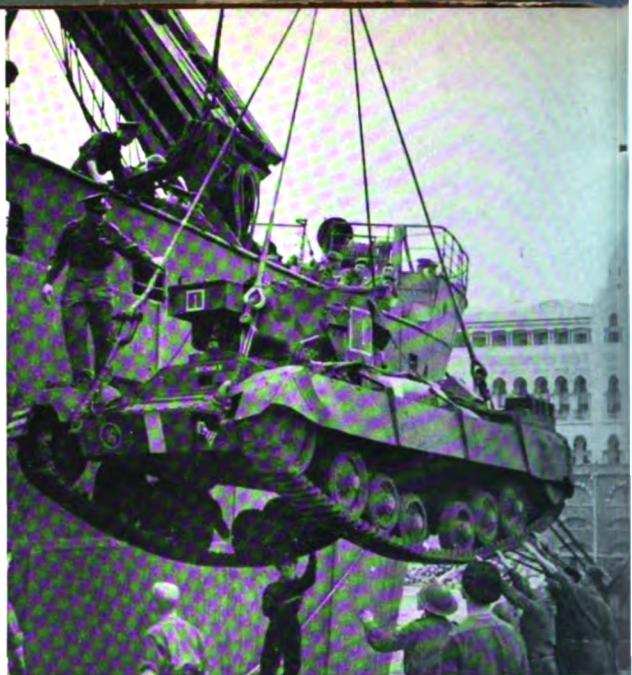
Thus has sea-power demonstrated its force, first in controlling an enemy-occupied littoral, then initiating and serving an offensive upon it, and finally consolidating that offensive.

The lesson has been well learned. No enemy coast is safe while sea-power dominates the waters surrounding it.

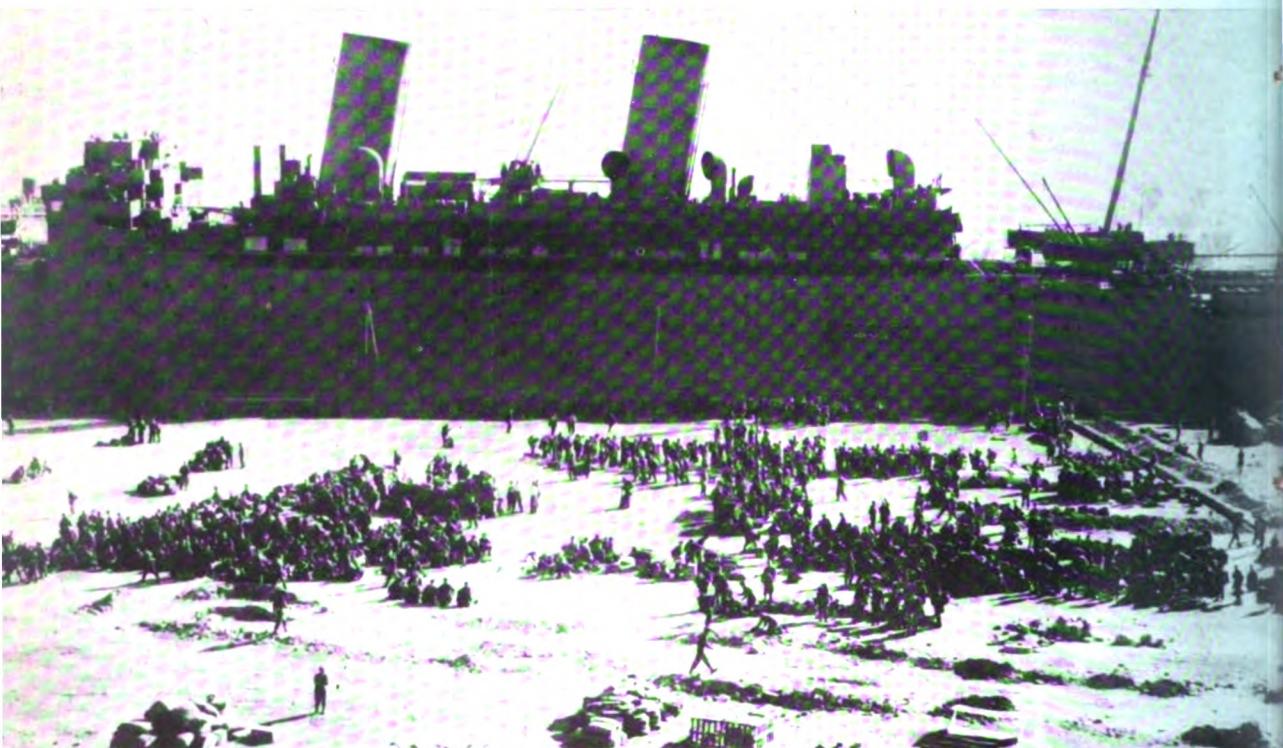
The struggle is indeed hard, and it may well be long; losses will be incurred, as they will undoubtedly be inflicted, by the Allies; but the fighting navies which maintain the sea-power of the Allied Nations will increasingly exert sea-power's decisive, crippling, irresistible force. The stake is the freedom of the world, and the freedom of the seas is the very first necessity for its foundation.



A giant bomber makes her landfall in Britain after a 2,000-mile journey to North Africa, escorting the great invasion armada.



Tanks for the offensive being unloaded at a North African port—part of an immense consignment of war material ferried by sea-power.



Unloading stores from a transport vessel at Algiers, one of over 850 ships, which took British and United States forces to the North Africa front.

THE STRENGTHS OF THE NAVIES

A review of the naval forces of the Allied Nations, contrasted with those of the Axis, confirms the sea-superiority of the Allies.

It will be plainly apparent, and should need no stressing and no excuse, that detailed information as to precise Allied strength at sea cannot be given in war time. The naval units available to Britain, the British Commonwealth, the United States, and their Allies at any given time, govern the whole strategy of sea-war in relation both to enemy "fleets-in-being" (see page 27) and to the day-to-day tasks of the navies.

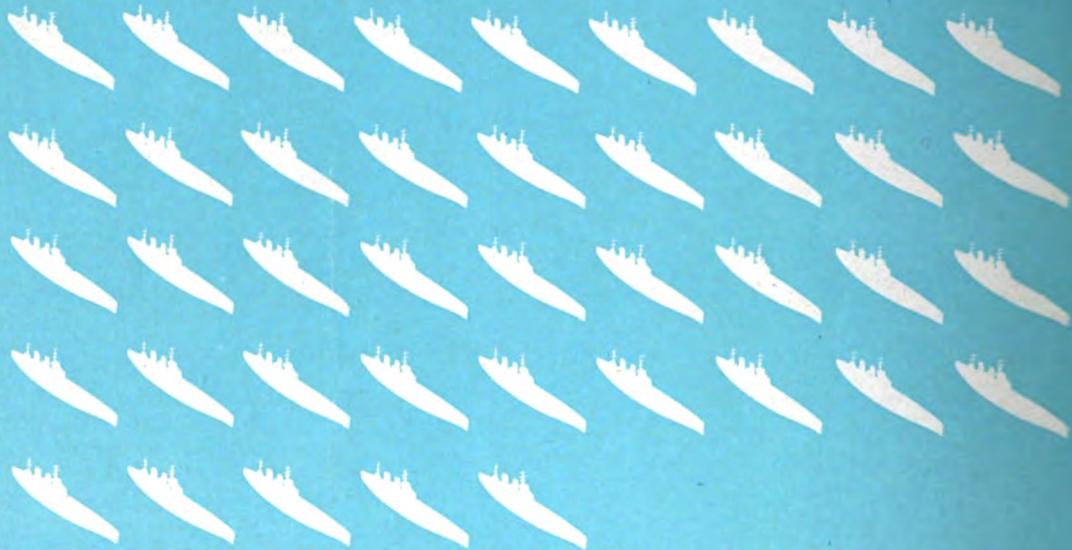
A clear guide to relative strengths, however, can be obtained by contrasting the total naval units commissioned (i.e., actually available for operations at sea) at the outbreak of war by both sides, deducting therefrom units known to have been lost, and adding units known to have been commissioned since.

When it is borne in mind that Allied shipbuilding capacity not only very greatly exceeds the optimum effort of the Axis, but proceeds also very much less interrupted by enemy action, it will be seen that these figures, allowing for an increase to *both* sides, yet represent a minimum statement of Allied numerical superiority.

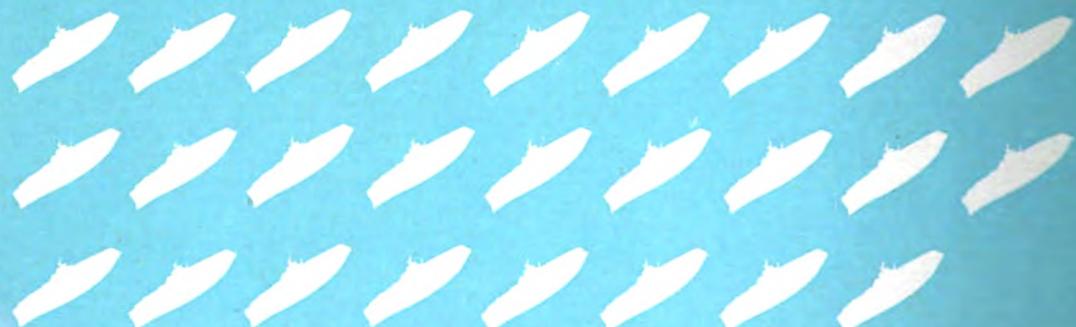
The forces listed include those of the Royal Navy, the Royal Canadian Navy, the Royal Australian Navy, the Royal New Zealand Navy, the South African Naval Forces, the Royal Indian Navy, the United States Navy and units of other Allied Powers on the one hand and the German and Japanese navies on the other. The figures of Allied strength include units of the Italian fleet which came under Allied control after the capitulation of Italy, while Italian ships known to have been sunk by the Nazis have been deducted from the Axis figures.

ALLIED NATIONS

BATTLESHIPS



AIRCRAFT CARRIERS



THE AXIS

BATTLESHIPS



AIRCRAFT CARRIERS



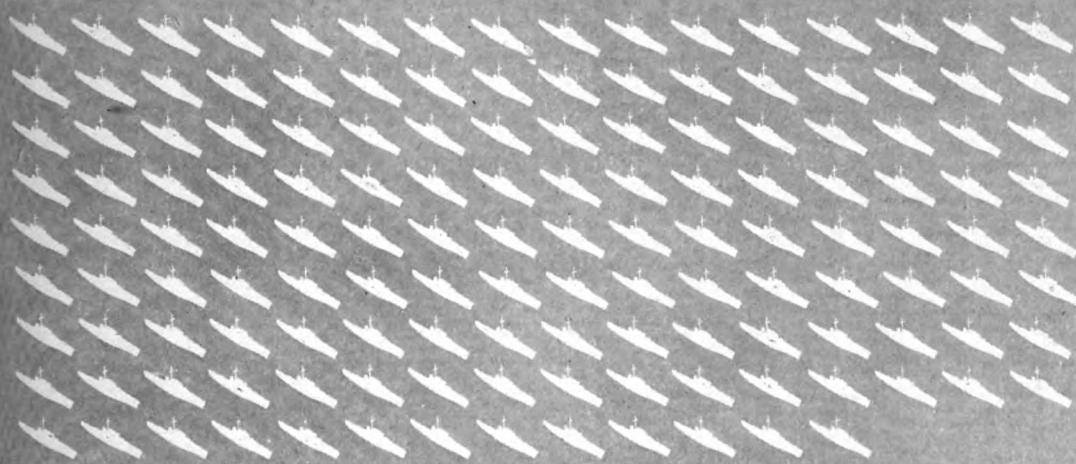
ALLIED NATIONS

DESTROYERS



THE AXIS

DESTROYERS



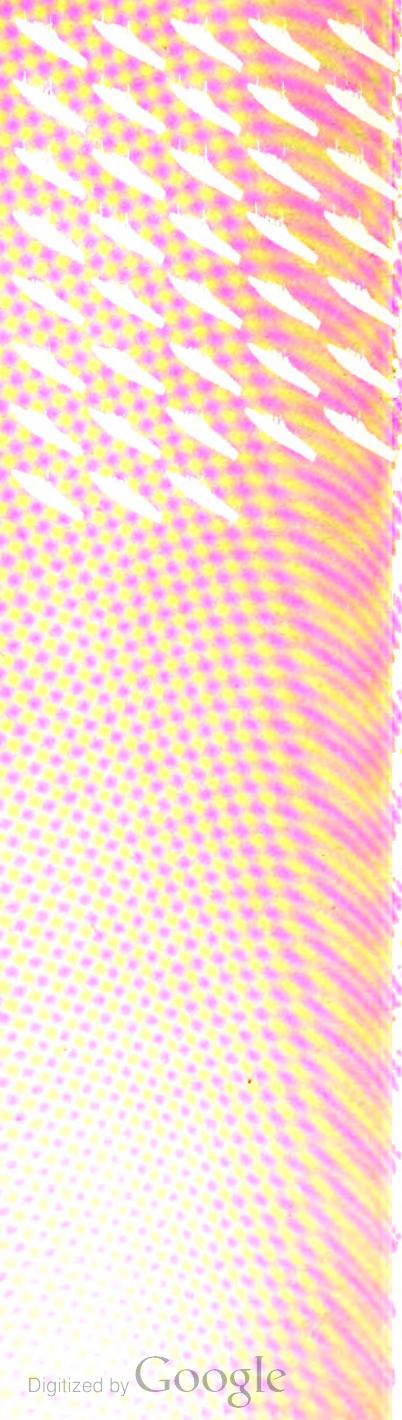
ALLIED NATIONS

CRUISERS



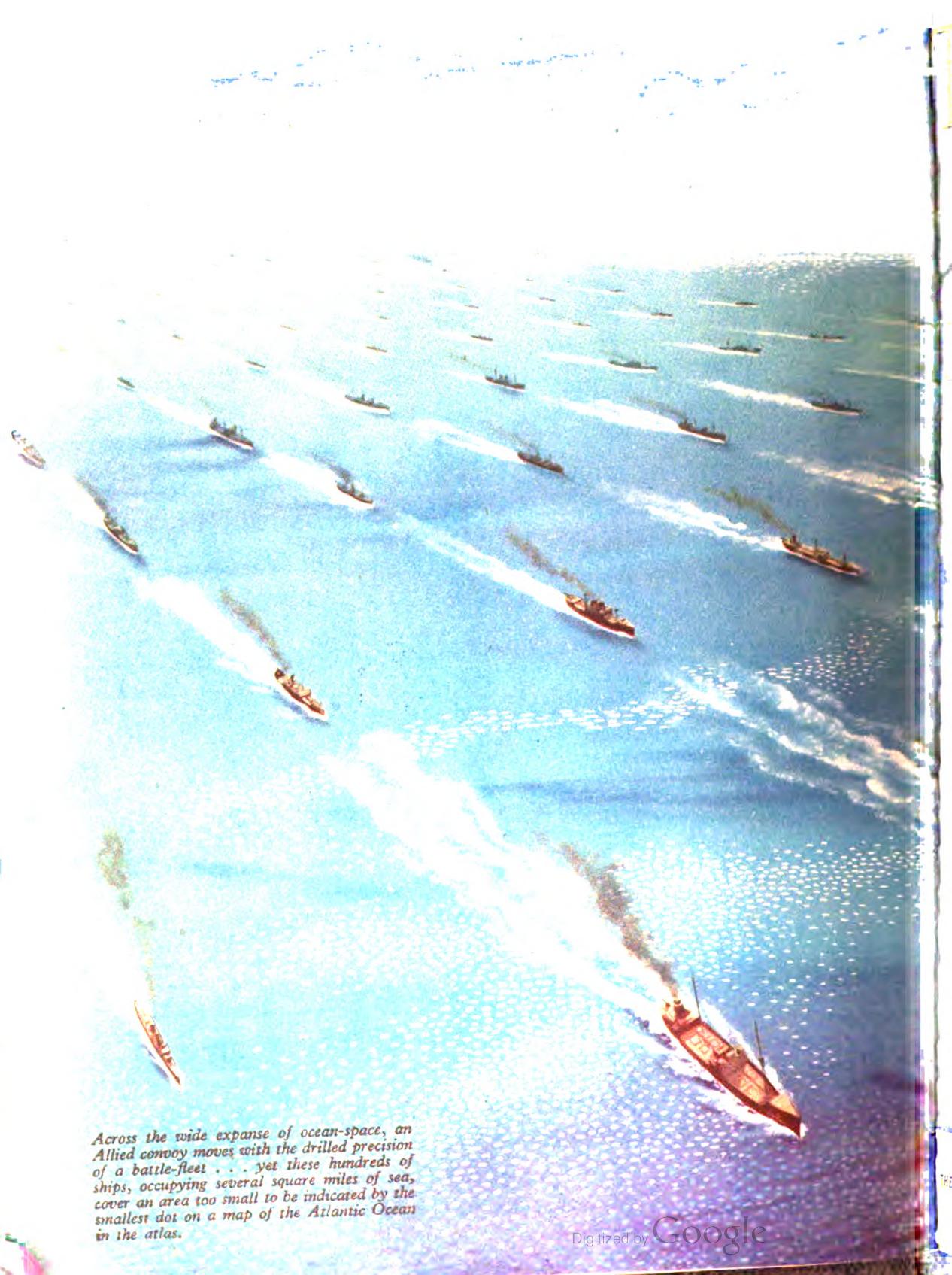
THE AXIS

CRUISERS





*A GERMAN
SUBMARINE,
awash in the
North Atlantic
swell, surrenders
to the crew of a
British bomber
and awaits a
prize-crew from
a British warship
hurrying to the
spot.*



Across the wide expanse of ocean-space, an Allied convoy moves with the drilled precision of a battle-fleet . . . yet these hundreds of ships, occupying several square miles of sea, cover an area too small to be indicated by the smallest dot on a map of the Atlantic Ocean in the atlas.

DEFENSE

There's Freedom

in

the Air



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NET

1950
THE OFFICIAL STORY OF THE ALLIED AIR FORCES FROM THE OCCUPIED COUNTRIES

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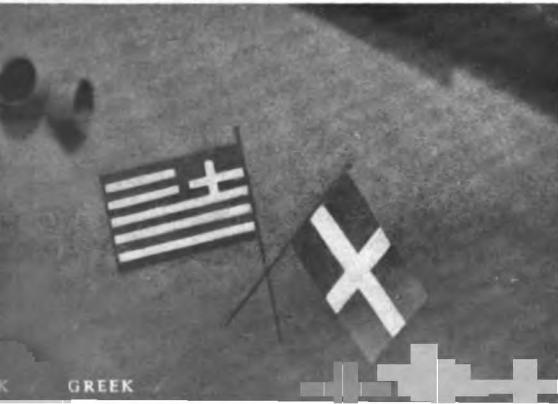
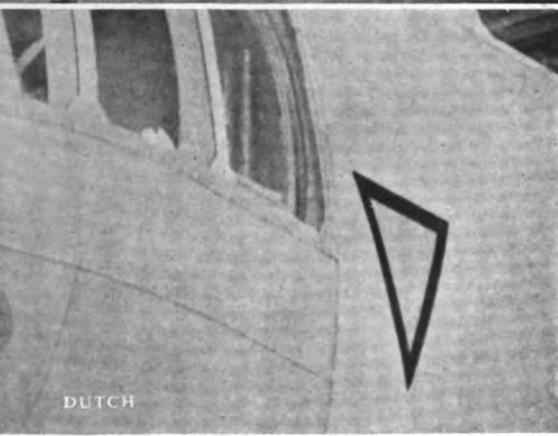
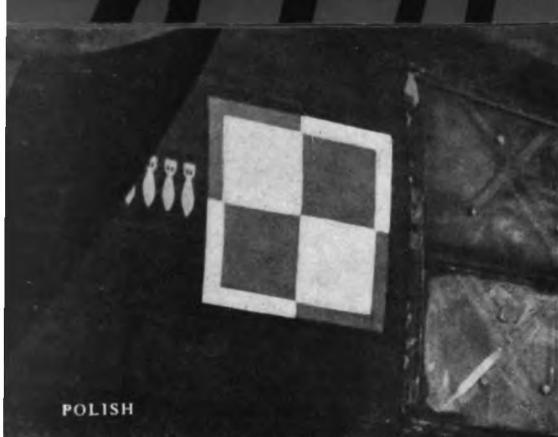
THE OFFICIAL STORY OF THE ALLIED AIR FORCES
FROM THE OCCUPIED COUNTRIES





There's Freedom in the Air

LONDON: HIS MAJESTY'S STATIONERY OFFICE



PREPARED FOR THE AIR MINISTRY



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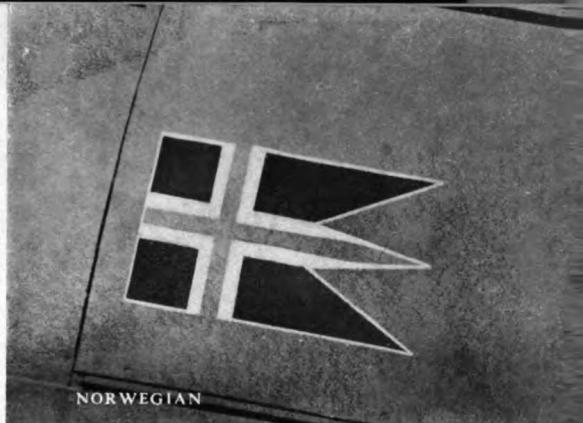
Gt. Brit.

BY THE MINISTRY OF INFORMATION

FOREWORD

THIS BOOK tells the stirring and ennobling story of the achievements of our European Allies flying and fighting side by side with the Royal Air Force. One by one their countries have been seized, their liberties destroyed, their governments driven into exile or suborned ; but neither the blandishments nor the oppression of the Nazis could break the spirit of the people. That spirit has inspired the brave men of those nations to give their all in the cause of liberty and freedom for which we fight. Poles, Czechoslovaks, Norwegians, Dutch, Belgians, Fighting French, Greeks and Yugoslavs have fought in the air with matchless gallantry against the might of the Luftwaffe. From bases in Great Britain, North Africa and elsewhere they have proved themselves fighting comrades of the Royal Air Force and worthy upholders of the proud traditions of their native lands.

Here is their story. No one could read it without being conscious of the heroism and devotion to duty of these gallant men. All will acclaim the superb courage which has led them, exiles from their homes and families, to take up the challenge of our common foe.



NORWEGIAN



CZECHOSLOVAK



BELGIAN

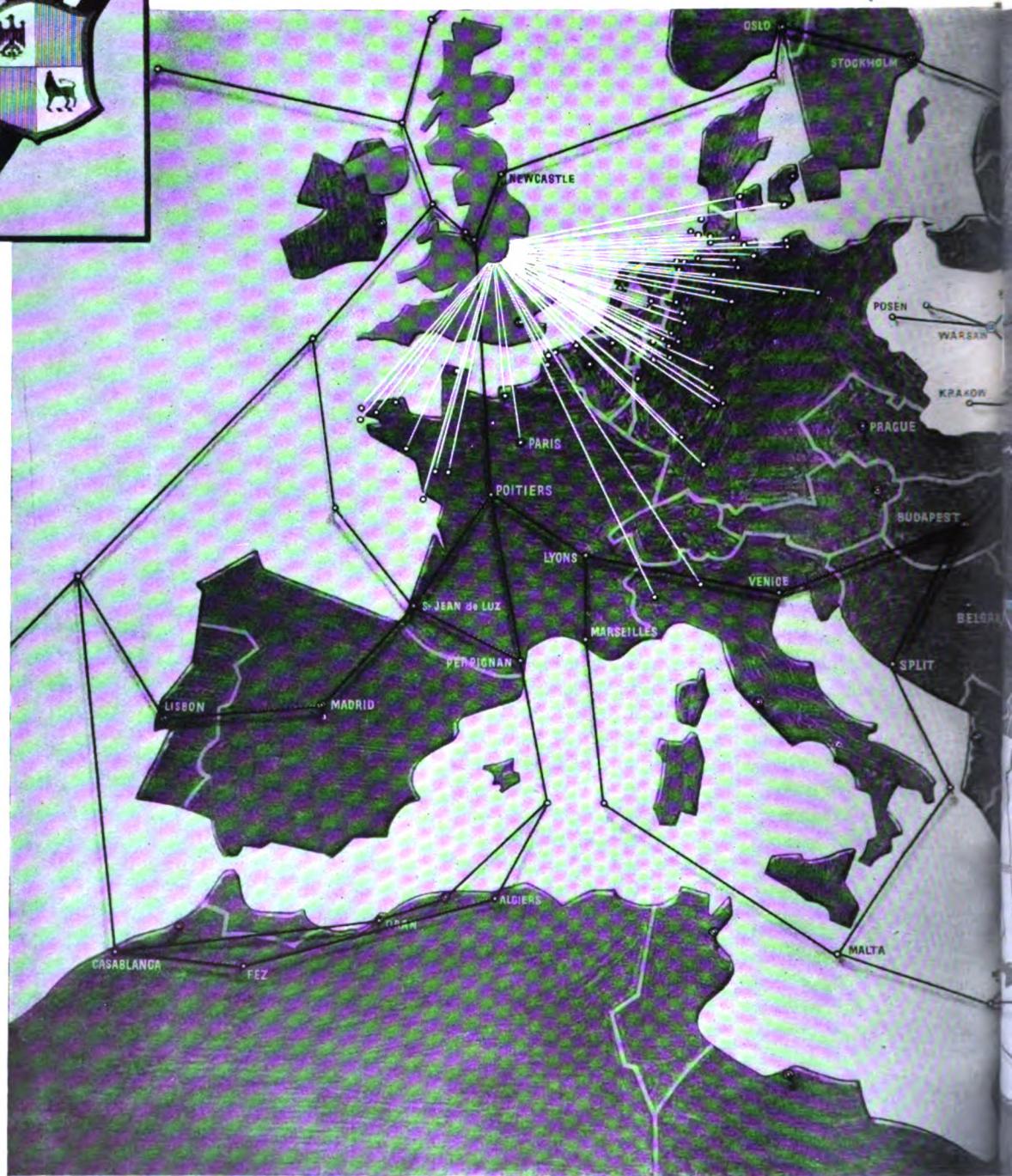


YUGOSLAV

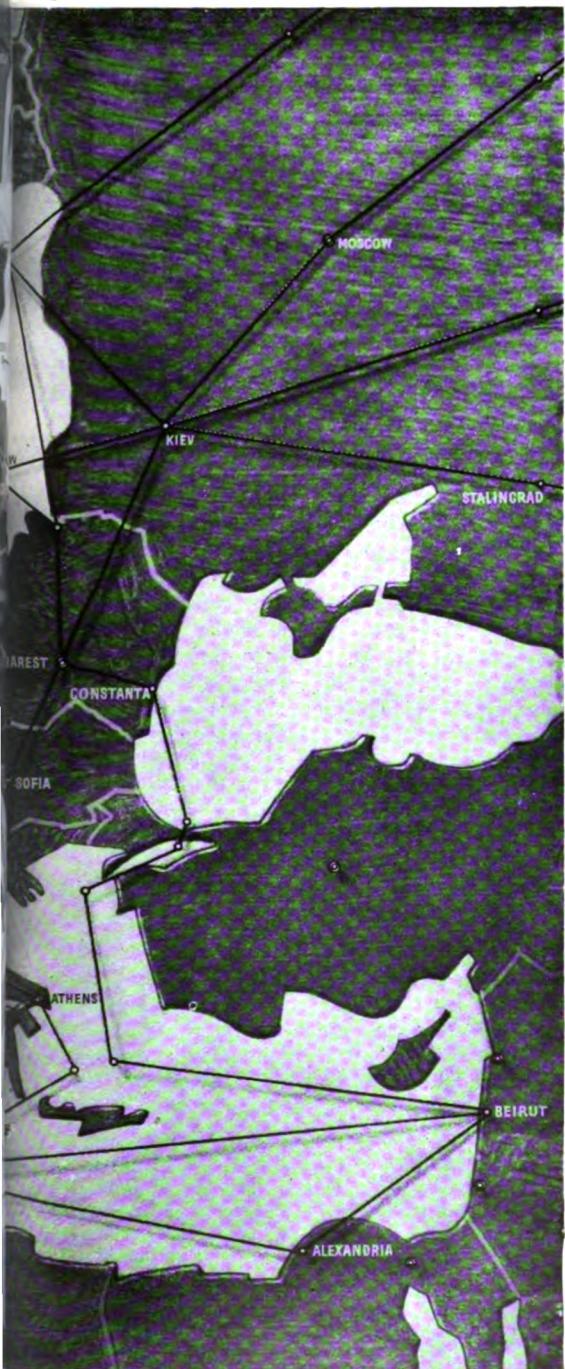
IRST PUBLISHED 1944.

There are many men and women in the Forces who would welcome a chance of reading this book ; if you hand it in at any Post Office, it will go to them.

Printed by Alabaster, Passmore & Sons, Ltd., London and Maidstone.



DARK FOR ESCAPE, BRIGHT FOR VENGEANCE are the strings on this map, which hangs in the Intelligence Room of a Polish bomber squadron. The dark strings indicate some of the routes which Polish airmen followed, leaving their homes in Eastern Europe (the area is coloured bright red on the original map), and journeying through many European countries, or via N. Africa, or round the Cape of Good Hope by S. America to the U.S.A., and so reaching Britain. The white strings show the raids in which they have exacted retribution



I. They Wanted to go on Fighting

THE WAR between Poland and Germany began at dawn on September 1st, 1939. Between that time and the virtual end of Polish armed resistance on Polish soil three weeks later, the world looked on at the first mass bombing of a great European city. It saw what an organised air force of 3,000 planes could do against an air force of only 300 planes, at first organised, and then disorganised by loss and retreat. It saw the first of a series of triumphs of numbers over national faith.

Mere numbers are destructible; faith is not. When war began, the Polish Air Force had only 300 planes of action strength. Of these, half were P-11c Fighters, a type quite slow according to modern standards. Of the rest, 36 were medium bombers of the Los P.37 type, and 60 were light bombers of the Karas type. The rest were army co-operation aircraft. But behind this small number of planes were great numbers of men. Poland was a country under conscription; the number of recruits to the Air Force each year was therefore considerable. If its reserves of aircraft were poor and soon to be used up, its reserves of men were enormous. If it was not possible to save the planes from destruction by the Luftwaffe, it became evident, as early as September 14th, that it would be possible to save the men. Before active Polish resistance in Poland had ended, therefore, the escape of thousands of men of the Polish Air Force—and also of the Polish Army and the Polish Navy—had been planned. This escape, both because of its size and because of its triumphs over hardship and distances, was one of the most remarkable in history.

On the wall of the Intelligence Room of a Polish bomber squadron that now operates from an R.A.F. station in England is a map. It is a map of Europe, West Asia and North Africa, cut in wood. The continents and countries are

There's Freedom in the Air



AIRCRAFT CAN BE DESTROYED. German soldiers examine the wreckage of one of the 300 Polish planes, which fought valiantly against the Luftwaffe's 3,000 during the invasion of Poland.

painted in colours. Europe, Africa and Asia are painted brown, Poland is bright red, England is bright green. All over this map, in a wide circle covering every single country except Germany, are scores of chromium pins. They are joined together with strings of blue wool. All these strings begin in Poland and lead ultimately to England. They are the journeys of escape.

There is scarcely a country in Europe, Asia Minor or North Africa to which one of these strings does not go. They extend as far north as Sweden, as far east as Russia, as far south as Syria and Egypt. They go through Roumania, where thousands of Poles first gathered after their defeat, through Greece and Yugoslavia, Turkey, France and Spain; even through Italy. The strings come, too, across the Atlantic, across the north from the United States, across the south from South America. They are scattered everywhere.

But on the map there are other strings. They are coloured yellow. They are not scattered. They are concentrated. Compared with the strings of escape they are short. They radiate from a single point in England to a circle of 60

different points, from Brest to as far east as the Baltic ports. These strings and these points are the record of retaliation. They are the record of the bomber operations of the Polish Air Force that was disrupted, scattered, and reunited, at last, in England. They are the journeys of retribution.

These strings partly represent the stories and certainly represent the aim of many thousands of men, men at first scattered, walking, train-hopping, sledging and plotting their way across Europe towards the two countries, France and England, where the red and white Polish flag was still flying as a symbol of passionate resistance against the regime that had destroyed Warsaw. Some represent the stories of men who, unable to escape before Poland's final collapse, saw the New Order come in, read the military decrees nailed up in Polish cities and towns by von Brauchitsch, disobeyed them and still escaped; who saw brothers and fathers tortured and beaten, wives and sisters sent to Germany; who picked up leaflets in Polish streets: "If you don't surrender we shall use poison gas at 12 noon to-morrow"; who smelled death on the streets after the mass bombings of September; who were told to surrender or go to German prison camps and who replied by forging passports—of men, in short, who put freedom higher than pain.

On a day in the autumn of 1939 a young Polish airman stood by a wall in a Polish farm-yard, waiting to be shot. The Nazi firing squad stood ready with their rifles, awaiting the order to fire. As the Pole stood facing them one of the rifles accidentally went off. The noise startled the rest of the Nazi firing squad, who immediately turned their heads. In that moment the Pole clambered over the wall and was gone.

The first of these men of the Polish Air Force began to reach England in early December 1939; only three months after the collapse of their country. In a sense they were fortunate. Europe had not crumbled; France was still a free country; the avenues of escape were still open. For these reasons they were to be followed by many thousands of their countrymen. Meanwhile many Polish airmen had reached France. They had skied across the Carpathians. They had been through the prisons of Hungary. They had stolen boats and had rowed down the Drava River into Yugo-

slavia. They had come by steamer to Marseilles. They found themselves in a France on the verge of defeat and disunity.

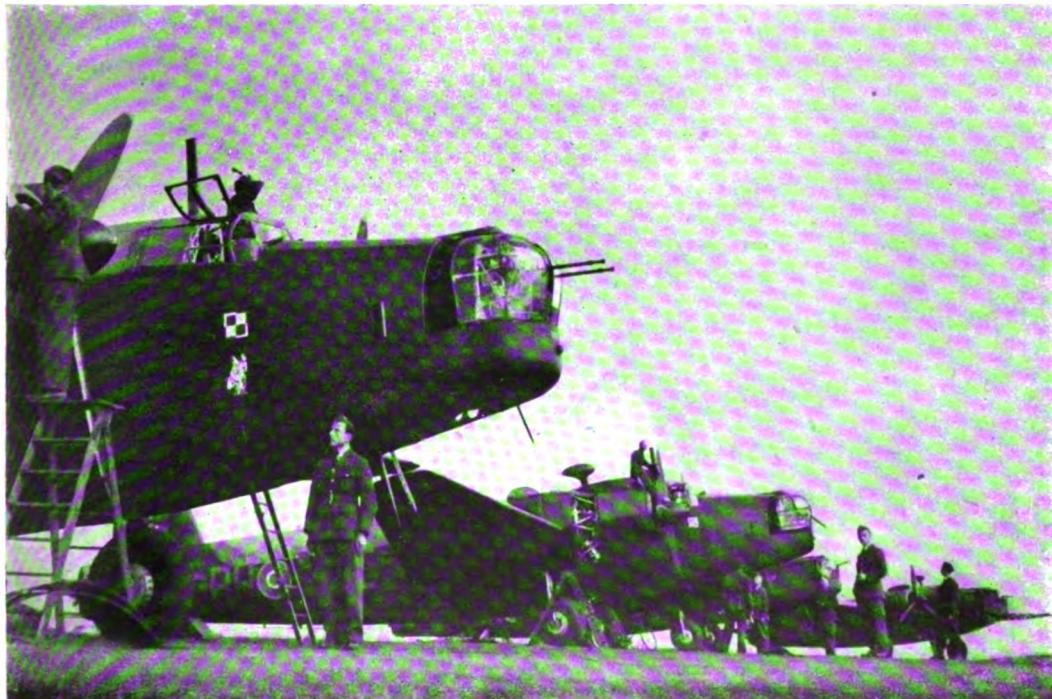
So in June 1940 their escape began again. There was now only one country left for them—England. "Thousands of us," says one of them, "came away from St. Jean de Luz. Some were in uniform of the Palestine police. Some said they were French soldiers, some business men, some from Turkey. And so on. Really we were all just Poles wanting to fight the Germans." And so, disordered, scattered, deprived of that self-determination which had been Hitler's righteous and indignant cry in 1939, but not disunited and by no means defeated, the Poles began to come to England.

They were not alone. Nor were they the first disinherited people of the war, though their soil was the first on which war had been fought. For the Czechoslovaks the war began, not with the

invasion of Poland in 1939, but with the Munich Agreement in 1938. From that moment every clear - sighted Czechoslovak saw the inevitable course of events. Immediately after Munich, Czechoslovak nationals, and particularly airmen, began to escape secretly from their country under cover of darkness, singly or in groups, by all kinds of routes and means. They, too, like the Poles, had one object. They wanted to fight Germany. The word *wanted* is worth noting. It is the key word to these pages; it is the consistent emotion binding together, in one purpose, these undefeated representatives of defeated peoples. *We want to fight Germany.* There is no other desire or aim.

Many Czechoslovaks, anticipating events correctly, escaped in 1938 and 1939 to Poland. Some remained there; some wandered on, through Eastern and Central Europe, on what was to be the long journey to England. When war began.

... BUT FAITH IS INDESTRUCTIBLE. The faith of her airmen, surviving Poland's defeat, enabled the Polish Air Force to be re-born in Britain. Wellingtons of a Polish Bomber Squadron on an English airfield.



many Czechoslovak airmen fought side by side with the Polish Air Force. When Poland fell, their way of escape was very difficult. Nevertheless, many of them reached France. There they joined the only Unit open to them—the French Foreign Legion—and it was not until France's entry into the war that they were embodied in the French Air Force. During that winter, there was little air fighting, and it was only in the spring of 1940, a few weeks before the collapse of France, that the Czechoslovak National Committee and the French Government came to an agreement whereby Czechoslovak airmen obtained their independence and were to be formed into national groups.

Like many other things in those days, it was almost too late. There was little time to organise. Over 100 Czechoslovak pilots were attached to various French squadrons, including the 5th Squadron of No. 1 Wing of the "Cigogne" Squadron, one of the most famous French fighter squadrons of the war. In these squadrons the Czechoslovaks fought themselves to a point of

exhaustion in the Battle of France. They fought with an extreme fanatical zeal and to the limits of physical endurance. There were many stories of pilots losing consciousness in the air and recovering just in time to make a safe landing. Some idea of the success with which they fought may be got from *Chasseurs de Ciel*, a book published by Captain Accart in the autumn of 1941. On the list of fighter pilots in France, Captain Accart places a Czechoslovak pilot, Captain V., as third with 15 enemy aircraft destroyed, another Czechoslovak, Lieutenant P., as fourth and a Lieutenant V. as 12th on the list.

On the collapse of France the Czechoslovaks found themselves in a desperate position. They were scattered over a country disrupted and disorganised by defeat. The Europe at which they looked now was a very different Europe from the excited but still unified continent of 1939. Poland, Norway, Denmark, Belgium, Holland, their own Czechoslovakia and now France had gone. For them, as for the Poles, there was now only one way of escape: to England. On the orders of their Commander-in-Chief, the Czechoslovaks assembled in the South of France and even in North Africa, to begin all over again the journey to a strange country in order to continue the struggle for their fatherland.

A first group of 19 pilots arrived in England by transport aircraft on the day after the French Armistice was signed. More followed immediately. On June 21st, Dutch and Polish merchant vessels, loaded with Czechoslovak airmen, arrived in English ports, and other vessels continued to arrive until the last transport reached Liverpool on July 9th. Only three days later, on July 12th, the Independent Czechoslovak Air Force was re-born. There was announced, with great national pride, the formation of the first Czechoslovak fighter squadron—No. 310. It practically coincided with the announcement of the first Polish Squadron, No. 300, to be formed in Britain.

Like the Poles, the Czechoslovaks were only just in time. They were in time for one of the great battles of history. It was a battle to decide, as we in Britain knew too well, not only whether Great Britain should survive as a free nation, but whether ultimately all Europe should survive, and it was right and opportune that the Czechoslovaks and Poles should take part in it.



TO GO ON FIGHTING. Czechoslovak airmen, after the fall of France, embark for Britain—the only country where they could continue the fight for their own fatherland.



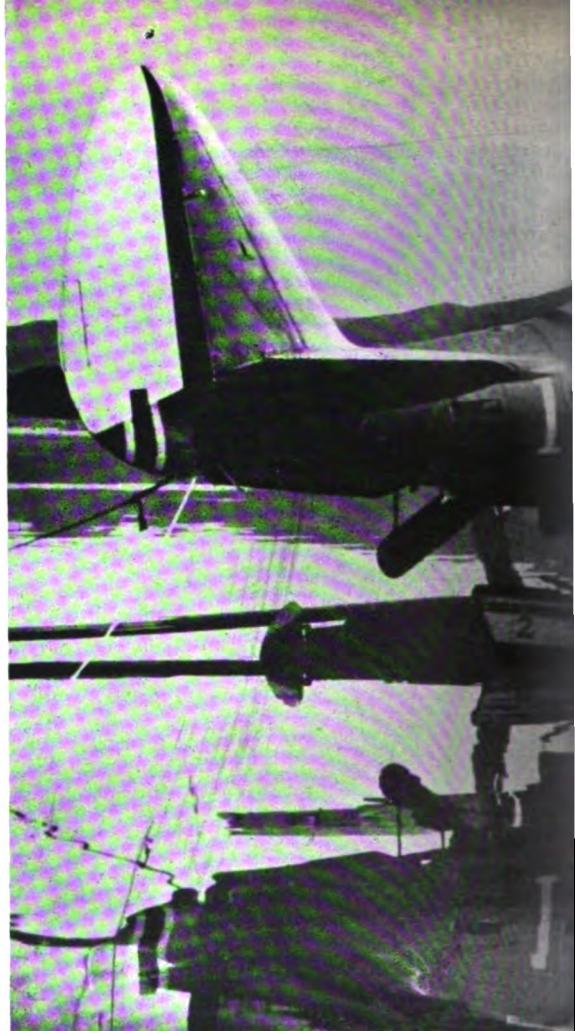
CZECHOSLOVAK FIGHTER PILOT. On July 12th, 1940, the Independent Czechoslovak Air Force was re-born on English soil. Its first fighter squadron was destined to play a notable part in the Battle of Britain.

2. Escape to Action

BUT WHILE the Czechoslovaks and Poles had been escaping through the long, tedious avenues of South Europe, Asia and Africa, much more had been happening in the north. The Norwegians, who had been flying an interesting mixture of aircraft in their short battle against Germany—using Gloster Gladiators, Curtiss Mohawks and Heinkel 115s—had also begun to arrive in England.

The story of the Battle of Norway is the story, with geographical differences, of Belgium, Holland and France. Both the Royal Norwegian Army Air Force and the Royal Norwegian Naval Air Force were very modest in size. Their aircraft were mostly obsolete types, built as early as 1925. They had few airfields, and these mostly in the coastal areas. In the summer and autumn of 1939 and the early spring of 1940, it was decided to alter this dangerous state of affairs. Both Forces were to be equipped with new types of aircraft: American Curtiss P. 36 Fighters and Douglas 8A5 Attack bombers for the Army Air Force, American Northrop N-3 P B. and German Heinkel 115 seaplanes for the Naval Air Force. Plans were also ready and funds allocated for the construction of new airfields. These plans were excellent. Their only fault was that they were too late.

When, by noon of April 9th, 1940, the Germans had succeeded in occupying all existing airfields and seaplane bases south of Narvik, it was obvious that the situation in Norway was very desperate. Against the modern forces of the Luftwaffe, estimated within the first weeks of the campaign to be something like 2,000 aircraft, the Norwegians had little to offer except Gloster Gladiators, which put up a gallant and hopeless fight in the defence of Oslo on the morning of April 9th, and such types as Heinkel 115 and MF11 seaplanes and Fokkers and Tiger Moths operating respectively with the Naval and Army Forces. In spite of this the Norwegian Air Forces retained their ability to operate right up



to the moment when the last Allied Forces, two months after the invasion, were forced to leave Norway.

Night and day, for example, the Norwegian seaplanes, operating from fjords and ice-covered lakes, bombed and harassed German transport and troop positions on the west coast. In co-operation with Army planes they made communication flights, linking up isolated units of Norwegian fighting forces in fjords and valleys. They operated until the situation in Southern Norway became impossible. Then the few naval planes capable of the long flight were



WINGS OF THE NORTH. In an Icelandic fjord, men of a Norwegian Naval Squadron get ready to set off on escort duty in a Northrop Floatplane. The Royal Norwegian Air Force is now the second largest among those of the Occupied Countries in Britain

flown to the north of Norway and there continued the work of reconnaissance, bombing and ground-strafing until finally, on June 17th, 1940, the whole situation in Northern Europe was revolutionised by the collapse of France.

And so the Norwegians, as the Poles and Czechoslovaks had done, came to England. The number of Poles was very large; the number of Norwegians quite small. The Poles had many means of escape, difficult and dangerous though they were; the Norwegians had very few. To navigate the North Sea to Great Britain was practically their only hope. A few were able to

fly floatplanes to Scotland, but many others made the journey by sea, in small merchant vessels or in fishing smacks. Some even rowed their way across the 300 miles of water. Even then, many difficulties were still in front of them. They were too few, too disorganised and too lacking in equipment to fight immediately, so they collected together in Canada the scattered remnants of their Air Force, and with recruits from North America formed their training headquarters known as "Little Norway." And though too late for the Battle of Britain, they later fought with the same tenacity and courage.

as had brought them hundreds of miles across that dangerous water.

As time went on they became a powerful force second in numbers only to the Poles among the Allies in Britain. In May 1941 they formed their own Naval Squadron of Northrop Floatplanes in Iceland, from which they flew many dangerous and tedious hours of convoy escort. In July 1941, and January 1942, they formed two new squadrons of fighters, Nos. 331 and 332, fought with them in the powerful sweeps over France, and in the bloody protection combats over Dieppe, with great distinction, and later made them among the highest-scoring squadrons in Fighter Command.

One of these combats is described in a Norwegian sergeant pilot's report during the Dieppe operations:—"When the Wing Commander ordered my section to attack, I dived down with my No. 1. Heading for the Dornier to the left of a formation of four, I closed in to 400 yards and gave him a two-second burst with cannons and machine-guns as it dived to port. The bomber dived through clouds, and I followed it down. Just below cloud the enemy aircraft pulled up and set course back towards the coast just south of Dieppe. As I approached, the top rear gunner opened up with his machine-guns. His shooting was very accurate, and I was hit in wings by several bullets. Having closed to 300 yards, I opened fire. Altogether I made three attacks on the bomber—two from port beam and one from starboard beam, closing to 150 yards. As a result of these attacks the crew started baling out. I saw three men jump and all three parachutes opened. The aircraft went down in a dive and finally crashed on the beach between rocks and the water line. It burst into flames, and I saw a man, probably the pilot, standing knee height in the water beside it. Having exhausted my ammunition, I returned to base flying alone as there were no other Spitfires in the area."

No sooner had the sergeant given his report than he went straight over to his Flight Commander. "Am I flying on the next trip, Sir?" His face was one big smile when he received the answer. Soon after reaching the patrol area, numerous enemy aircraft were seen to approach flying in pairs and "fours"—a formation of six was also seen to be operating. Sgt. X. was flying as Red 2 when his section was attacked

by three enemy aircraft coming out of the clouds. A number of dogfights developed and Red section became split up. Sgt. X. was flying alone when he saw two F.W. 190s coming in from astern to attack another lone Spitfire below and to port of himself. Sgt. X. dived down on the right-hand enemy aircraft, opening up with cannons and machine-guns. The range was rather long, and he saw no results from his firing, but he achieved his aim in that the enemy aircraft broke off their attack on the Spitfire. As he was about to pull up from his dive, he found himself attacked by five F.W. 190s coming in from port quarter and above. He tried to turn his aircraft around so as to meet the enemy aircraft head on, but had only made a half turn when a hail of bullets hit his aircraft. The F.W. 190s dived by and disappeared in the direction of the French coast. He was not hit himself, but his aircraft started burning and the engine cut out at 5,000 feet, leaving the pilot no other choice than to bale out. He released his hood and Sutton harness and then turned his aircraft upside down. By so doing he was thrown out of the aircraft, which spun down and soon after crashed into the sea. He pulled the rip-cord as soon as he was thrown clear. The parachute opened satisfactorily, and descending slowly he finally landed unhurt in the sea, having released his parachute harness on touching the water. He inflated his dinghy and entered it, thinking that to be shot down was not such a frightful experience after all. He did not get much time to use his experience as a sailor, as he was picked up by a motor gunboat of the Royal Navy some 15 minutes after entering his dinghy.

The Norwegians have also many pilots and navigators in Bomber Command and in British fighter squadrons as well as in Transport Command, which flies countless new aircraft from the factories of Canada and the United States across the Atlantic to the European battle-ground.

By the early summer of 1940, Holland, and Belgium too had fallen. Both had fought against the greatest odds. The story of their defeat was the story that had repeated itself, tragically, all across Europe. Faith and courage were in greater supply than weapons, and could not prevail without them. So again, in small boats, in fishing smacks and even in rowing

boats, Dutch and Belgian airmen made their escape to England.

A young Belgian was captured by Germans in the fighting near Saint Germain-en-Laye in the summer of 1940. He was imprisoned and escaped; he was found and re-enlisted as a munitions worker; he performed acts of sabotage until things became too dangerous, and then escaped again. He reached the Pyrenees, walked across the mountains, and was arrested a few miles from Barcelona. From a concentration camp he made another escape, got back to Marseilles, found it too dangerous, and decided to go back to Belgium. He was then arrested by French police, and had to escape again. As he was crossing the line into Occupied France he was picked up by a French patrol, and again imprisoned. He again escaped, went to Antwerp, and, after weeks of hiding, set off for Spain. He was once more arrested, handed over to the French police, and once more got back to Belgium. His last escape was to England. With friends he set out to row across the North Sea in a small boat. On the way they were machine-gunned by German airmen; all his friends except one were killed outright or were wounded and died in the boat. The boat itself was holed by bullets, the food soaked by blood and sea-water. The situation was so desperate that the two men, after unsuccessfully trying to catch sea-gulls in order to drink their blood, ate toothpaste and drank sea-water. But finally, in spite of everything, they reached England.

Two Dutch pilots arrived respectively in a Fokker seaplane and a Fokker fighter, both aircraft carrying German markings, a dangerous enterprise which happily ended well. But the Dutch and Belgians, like the Norwegians, were few in numbers. They were not always to be few, and their resolution, if not so demonstrative as that of the Poles, or so buoyant as that of the Czechs, was great and clear and invincible. Happily, too, the Belgians had, before the war, been trained very largely on Hurricanes. The Dutch were well trained on coastal craft, of which they had succeeded in bringing a few Fokker T.8.W.s to England. The Dutch and Belgians were thus in time, and ready, for the Battle of Britain. As fighters the Belgians became very successful, and nine months after its formation one Belgian squadron had

already shot down or damaged 30 enemy planes.

Finally, on June 26th, the first Fighting French pilots arrived in England. Their position was, perhaps, the most tragic of all. France had suffered a catastrophe from which it seemed quite possible she would not recover for the rest of the century. The Poles, the Czechoslovaks, the Norwegians, the Dutch and the Belgians had reached England together with their Governments, their national unity unbroken, supported in some cases by rich resources capable of equipping them with new aircraft. They were one with each other; they had complete autonomy. The French enjoyed no such privileges. France had asked for an armistice and had found itself the victim of the most subtle of all political divisions—the Occupied and the Unoccupied. Every Frenchman who escaped to England to continue the fight was therefore in the eyes of the Vichy Government a traitor. He was liable in his absence to be condemned, as in fact many were, to death.

In spite of all this, many Frenchmen refused to accept defeat. They came to England. They came, like the Poles and Czechoslovaks, by way of Spain and Africa and the Mediterranean; like the Norwegians and Dutch and Belgians, in merchant vessels, fishing smacks and even rowing boats across the sea.

They escaped to freedom by even stranger ways. On a day in 1940 many distinguished French officers, loyal to Vichy, were lined up on an airfield in North Africa; an airfield now in American hands. There was to be a presentation of decorations to French pilots who had distinguished themselves in the war. Among them was a French bomber pilot who had been captured by the Nazis in the French retreat, who had escaped, been hidden for weeks in a French port and had finally bicycled down through France, swimming rivers at night, until he reached Toulon. He, too, was apparently loyal to Vichy. Before the presentation of decorations there was to be a display of flying. At the assigned moment the pilot took off with the rest, circled the airfield and then quietly broke formation and flew off—to Gibraltar.

The Frenchmen who joined us came in full knowledge of what the consequences might be, not only for them, but for friends and families left behind. They came, like the rest, because they wanted to go on fighting.

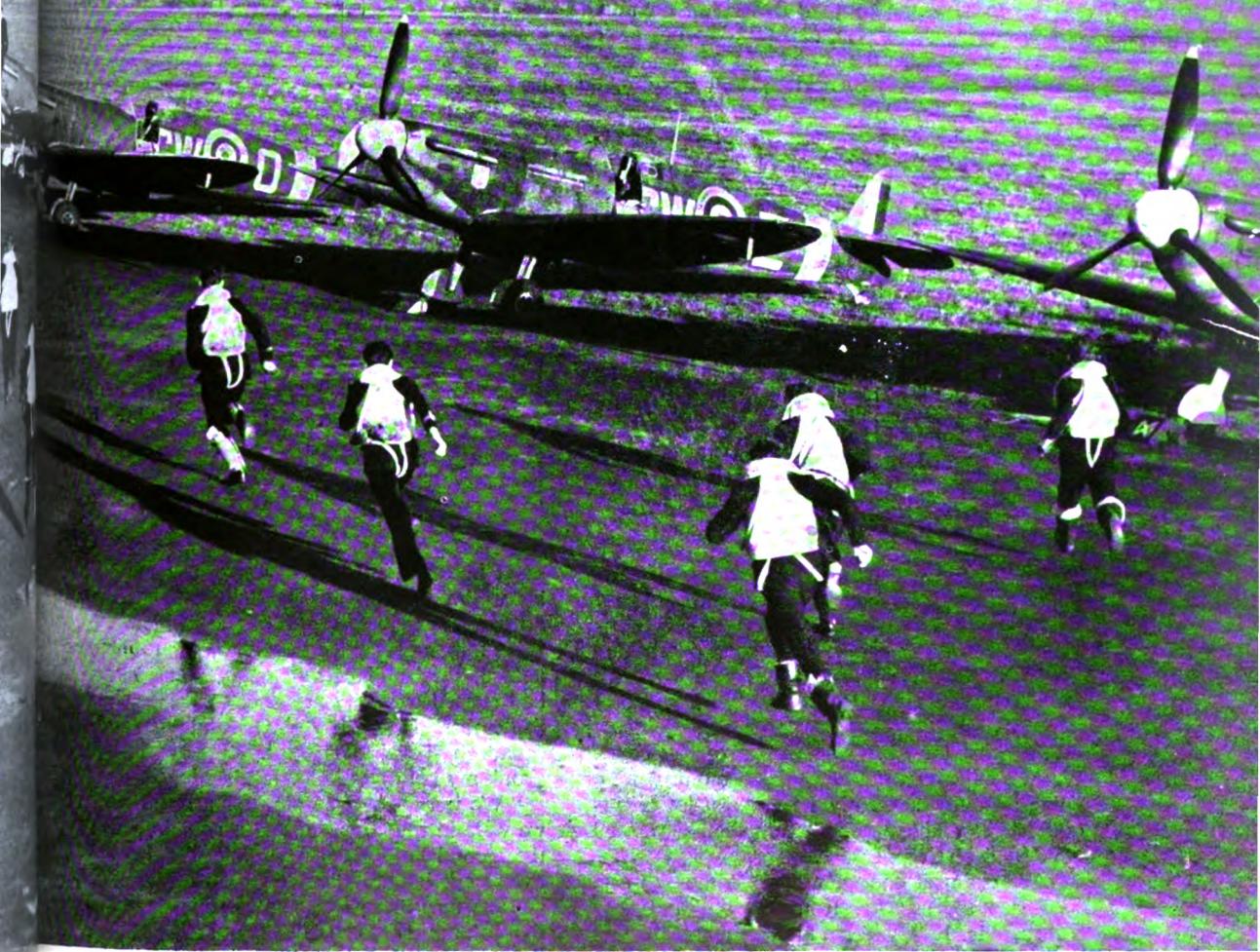
3. In Defence of Britain

IN THESE three stories of escape—three out of many thousands—it is possible to see the whole spirit of the unconquered peoples of Europe; the courage, the audacity, the sublime determination to be free, a pugnacious refusal to be dominated. Of these thousands of escape stories, wonderful and tragic, bitter and glorious, inspiring and humbling, the larger part can still not be told. Many of them are the greater epics of the war. All it is possible to say of such escapes, and of such a spirit of audacity, devotion and courage, is that thousands of Polish, Czechoslovak, Dutch, Norwegian, Belgian and French airmen reached Britain in the summer of 1940, and stood ready, as Great Britain also stood ready, for the new battle to begin.

But devotion, audacity and courage are not everything. Almost every schoolboy wants to fly a Spitfire; but desire without training remains a negative thing. So with the Allied airmen who arrived in this country. Their courage could never be questioned. But few of them could speak English; fewer still were trained to fly British aircraft. Nor are pilots of much use without ground staff, technicians, riggers and fitters—in which most of the escaped Allies faced a serious deficiency. Thus, when the Battle of Britain was about to begin, there were relatively few Allied squadrons ready to take part in it. Behind these few squadrons, in Scotland, in Wales, in Canada, units of the escaped airmen of Europe were learning English and were re-learning, according to R.A.F. methods, how to fight and fly.

Nevertheless, some were ready. The Poles and Czechoslovaks, having begun to arrive first, were by far the largest force. By July 1940, the first two Polish bomber squadrons, Nos. 300 and 301, had been formed, though they were not to begin operating until September; and the first Polish fighter squadrons, Nos. 302 and





DEFENDERS OF BRITAIN. From the moment of their arrival in this country, Allied airmen prepared to take part in its defence. Pilots of the first Free French fighter squadron race to their aircraft.

303. The first Czechoslovak squadron, No. 310, had also been formed.

Within three weeks of each other, on August 7th and August 26th respectively, the Poles and Czechoslovaks had their first success in battle. On the first date the Polish squadrons No. 302 and 303 shot down five enemy planes without loss to themselves. On the second date the Czech squadron No. 310, operating in four sections of three aircraft each, met the enemy for the first time and, in a dramatic encounter, shot down two planes. In this encounter the Czechoslovaks were led by an English flight-commander—a combination of nationalities that has been one of the happiest features of the war.

But on September 7th, exactly a month after their first victory, the Poles did even better. That day, indeed, they did magnificently. At about half-past four in the afternoon a formation of 16 Hurricanes of No. 303 squadron took off to meet a large enemy bomber formation protected heavily by enemy fighters. An extremely fierce encounter took place over Essex, where the Poles had kept a rendezvous with one of the most famous of all R.A.F. -squadrons, the thirty-year-old No. 1. In a short time the Poles alone scored the following successes :—

- 10 Dornier 215s destroyed.
- 3 Messerschmitt 109s destroyed.
- 2 Dornier 215s probably destroyed.
- 2 Messerschmitt 109s probably destroyed.
- 2 Dornier 215s damaged.

For this magnificent achievement the Poles paid with three Hurricanes, from which two pilots jumped safely; the third was wounded. The day was historic. The Poles had given to the world their first real demonstration of that fanatical courage, determination and skill for which they have since become famous.

A Pole gave this description of one operation : "At 6.40 we were already up in the air. We were directed by R T to the south coast of England, and warned of a strong enemy formation making for one of the towns on the coast. We were heading for this direction and were going all out. Suddenly I noticed a lot of aircraft slightly above us. I immediately warned the Squadron Commander.

" We changed course, went into the sun and then into the attack. It turned out that they were all Me. 109s, without any bombers. Dog-fights ensued immediately ; we came up against

odds of 1 to 6 and 1 to 7, but no one thought of that. I got hold of one Me. and started to twist and turn with him. I then noticed that another Jerry was coming in on my tail. I made a violent turn and fell into a spin. I pulled out and then I saw an Me. about 200 yards in front. I got on his tail and opened fire without using any deflection at all. Eight machine-guns did their work. Bits flew from the Jerry, and soon he went down to the ground in smoke. I followed him down and saw how he exploded about six miles north of Dover. Soon after I saw several others falling down to earth. My squadron was at work ! However, it did not last long. Jerry made back for home, and a few minutes later we too received instructions to return. We came back singly, but we all got back.

" Sometime about 12.30 we were called up a second time. This time we saw a large bomber formation approaching with an escort of fighters. We met Jerry just over the coast, but on seeing us he made a sharp turn and dived down to attack some town beneath us. The C.O. led us in to head him off, and we almost succeeded. I got on the tail of a Ju. 88 and pumped in round after round. Both his engines started to burn : he came down lower, turned out over the sea, and just as he crossed the coast, exploded. I circled over the burning remains, and just then I caught sight of a Defiant in a fight with an Me. 109. Quite unseen by the Me., I came in under his belly and pumped in the rest of the ammunition. but it was just a bit too late, as the Defiant was already on fire and was dropping down to the water like a stone. A moment later my Me. burst into a black smoke and crashed close by his victim. A few minutes later and there was no trace on the water of either machine.

" I took a course for base and after 15 minutes landed, tired and perspiring, but happy that I had started to repay my debt to the Boche for September 1939. My C.O. and the whole squadron were overjoyed. Good lads—they shook my hands and congratulated me.

" We were not given long for a rest. At 2.30 we were in the air again. Our squadron was in the second line of defence. We met Jerry well over land, but we were lower down. The C.O. made a turn and we started to climb, parallel to the column of Jerries. They, meantime, were throwing out their bombs on the towns lying on

ARMAMENT
SECTION
SEKCJA
UZBROJENIA



NEW WEAPONS, NEW WORDS. Allied personnel must learn to fly and service English aircraft, and to speak the English tongue. Polish aircraftmen are seen at a lecture.

the road to London. Some 25 miles outside London we were above Jerry, and we went in to attack. Just as our first aircraft opened fire, about 30 Me. 109s attacked us. The last two Sections got to grips with the fighters, while the rest took on the bombers.

"I was attacked by three Me. 109s. I took evading action, closed down the throttle, and when the first Jerry shot past me, gave him all I could. Instantaneously he broke into flames, lost both his wings, and like a rocket went down to ground, but the other Me.s had already opened fire on me. I did a half roll, pulled back the stick, and at once lost sight of Jerry, but this manœuvre lost me some 4-5,000 feet. I started to climb on full throttle so as to reach the nearest group of bombers, which were flying calmly along without any protection, and so far had not been attacked at all. After two or three minutes I was in a good position. At a convenient moment I opened fire and directed it on the nearest Ju. 88. The rest of the Jerries fired at me with tracer bullets. This made a fine sight, as the smoke remained in the air and formed a fan-shaped pattern. My ammunition gave out after a few seconds, so I did a left climbing turn and dived down, as two machines had appeared quite near me. After losing several thousand feet I looked at my Ju. 88. There he was, in flames, spinning down to the ground."

The Czechoslovaks, too, had been doing great work. In the first month of its operations, No. 310 Squadron had shot down 28 enemy planes, and had damaged many others. But by this time No. 310 Squadron was not alone. A second Czechoslovak squadron, No. 312, had been formed on August 29th, and many Czechoslovak pilots had been drafted to squadrons of the R.A.F. The two Czechoslovak squadrons were not only manned by Czechoslovak pilots, but were maintained by Czechoslovak ground personnel. To many of these men, excellent engineers though the Czechoslovaks are, the British aircraft were unfamiliar. They were not only maintained in first-rate condition, but the numbers of them increased, and the Czechoslovaks flew them with characteristic distinction.

And so, all through the Battle of Britain, the symbols of these two peoples were carried into combat on the fuselage of British aircraft. The scarlet and white chess-board painted on the



SYMBOL OF FREEDOM. A Belgian pilot flew back to his country, at immense risk, to rescue the flag of the Belgian Air Force. The flag is being presented here to the first Belgian squadron to be formed on British soil.

planes of Polish squadrons, and the red, white and blue circles, with the white lion on a red background, which form the emblem of the Czechoslovaks. These circles are the national colours of the Czechoslovaks. The lion is the emblem of the Czechoslovak State.

The red and white chess-board of the Polish Air Force, its official emblem according to international aeronautical law, has its origin in the last war. When the Poles took possession of aircraft left behind by retreating Germans in 1918, they replaced the German iron crosses painted on the aircraft by coats of arms belonging to such districts of Poland as Warsaw, Lwow, Poznan, Kracow, and so on. Finally, in the

spring of 1918, it was noticed that aircraft operating from the Lwow airfield bore the red and white chess-board. Soon afterwards it became officially accepted, and has remained ever since the emblem of the Polish Air Force.

While the Poles and the Czechoslovaks were fighting with such positive distinction in the air battles of 1940, the Belgians, Dutch and French, inevitably in less numerical strength, were operating too. The Belgians, perhaps, were the most fortunate of the Allied pilots who came to England. For in the Belgian Air Force, before the war, they had been trained on British Hurricanes. Their transition to R.A.F. methods was therefore rather easier than that of Poles and Czechoslovaks who had been trained on aircraft of Polish, Czechoslovak, American and Russian manufacture, and of the Norwegians, who had mostly flown types that could only be described as obsolescent. The Belgians were, like the French, handicapped by lack of numbers: but although it was not until after the Battle of Britain that the first separate Belgian squadron was formed, many Belgian pilots, like many French ones, were able to fight in the battle in squadrons of the R.A.F. Indeed, a number of R.A.F. squadrons and sections were, and still are, commanded by men of the Allied Air Forces.

But before that first Belgian squadron was formed something happened that typified, perhaps better even than a total of victories, the Belgian national spirit. For the Belgians, too, had a symbol. It was a flag. It was the original flag of the Belgian Air Force, and during the retreat of the Belgians in 1940, it had been left in occupied territory in the secret keeping of faithful friends. A Belgian airman who knew of the hiding place volunteered to fly to Belgium, find the flag, and bring it to England. He knew quite well of the immense risks of that undertaking. But he flew to Belgium, found the flag as he had promised, and brought it to England. And there, before the members of the Belgian Government, H.R.H. Prince Bernhard of Holland, the Secretary of State for Air, Allied representatives and diplomats, a few privileged civilians and, not least, many Belgian pilots, the flag was presented to the first Belgian squadron formed on British soil.

Meanwhile the Dutch had not been idle. As early as June 1940, a unit of the Royal Dutch Naval Air Service was formed at Pembroke Dock.

armed with Fokker seaplanes and manned by such trained Dutch naval air personnel as were ready. This unit was called No. 320 (Dutch), Squadron, R.A.F., and it was put under the operational control of R.A.F. Coastal Command. Very soon afterwards a second Dutch squadron, No. 321 (Dutch), was formed and equipped with Anson aircraft. The personnel consisted of the remaining trained Dutch air crews, and some semi-trained pilots, observers and air-gunned.

Holland's record in the Battle of Britain may not have been spectacular. The public which saw day after day the great air-battles of south and south-eastern England were perhaps too enthralled and excited to remember that Great Britain was surrounded by sea, and that one of the most vital, most arduous and least spectacular jobs of the war was the job of coastal air patrol. It could not know that in one year Coastal Command would fly almost 150,000 hours and about 17,000,000 miles, over the seas from Iceland to Gibraltar, from Norway to the Outer Hebrides, bombing enemy shipping, depth-charging U-boats, protecting convoys on the sea-routes of supply; or that the Dutch, a nation rich in sea-faring history, whose sailors had been among the great navigators of all time, were taking a daily part in that vital, monotonous but often dangerous task.

It is one of the paradoxes of the war, indeed, that the small figure of 50 aircraft destroyed means more than the colossal figure of 17,000,000 operational miles. The perspective, here quite wrong, does an injustice to Coastal Command in general, and to the Dutch squadrons in particular. For the Dutch not only patrolled the seas, bombed shipping, and depth-charged U-boats. They did much work in air-sea rescue, saving by their accurate navigation and skilful plotting the lives of many fighter and bomber pilots shot down at sea. That their work was not always front-page news did not mean at all that it was not great. The work of Coastal Command pays its dividends slowly. A pilot saved from the sea may mean, perhaps, in time, long after the public has forgotten the incident, that ten more enemy aircraft have been destroyed. A convoy safely protected means more life to more people than a fallen Messerschmitt. And finally, the Dutch observer who flew back a Hudson from Norway after his pilot had been killed, may stand higher in heroism, because he had never been taught to

fly, than many a pilot of a romantic Spitfire.

That observer wrote:—"One day my crew and I were detailed to do a daylight anti-shipping patrol off the Norwegian coast. My job on this trip was navigating, and I had never flown a Hudson myself and never thought I could.

"We took off at about noon and set course towards the Norwegian coast. Most of the trip was done under bad weather conditions, cloudbase was about 800 feet, and it was raining steadily. But as we reached a point 30 miles off the enemy coast, the weather cleared and the rain stopped.



"THE LIGHT-WEIGHT CAN HIT HARD." This Dutch ground crew is bombing up a Fokker T.8.W., one of the aircraft they succeeded in bringing over to England.

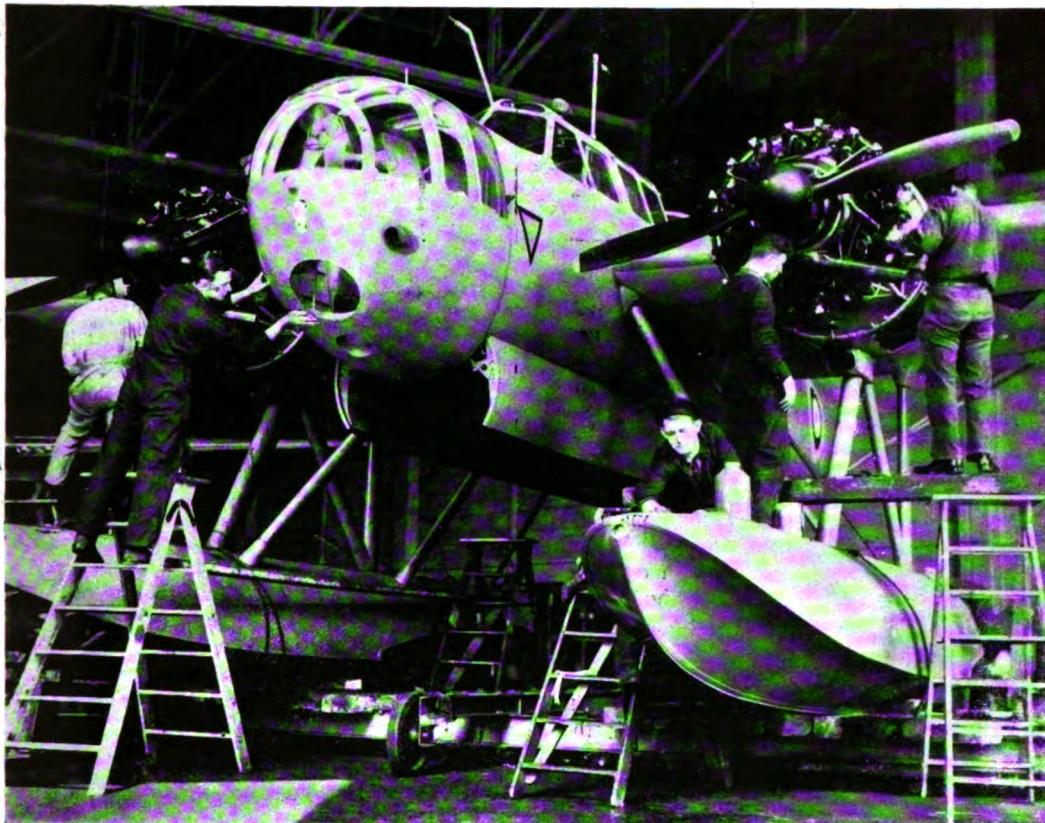
We flew on a course parallel to the coast in search of enemy convoys. After about 15 minutes' flying, we sighted one—two medium-sized supply ships and two escort vessels or flakships. We dived into the clouds and kept nipping in and out to make out the lie of the land. We finally decided to attack the biggest supply ship from the rear. We got into position, shut our throttles, and glided out of the clouds to make our bombing run. At first they didn't seem to realise what was happening, but as we got within 300 yards' distance, they opened up with light and heavy machine-guns and cannons. The fire was heavy and became more and more accurate. We swooped over the ship, released our bombs and then tried to make our getaway. Then things began to happen.

"There was a hell of a bang—one of their cannon shells had hit us right by the cockpit; just afterwards another hit us a little behind, almost severing the control wires, as we learnt later. At the same moment the pilot—a chap weighing 13 stone—collapsed. The shell had exploded by his left leg; after a few seconds he was unconscious, and within a few minutes bled to death. I was standing close to him and reached over his body to seize the controls.

"I pulled hard on the stick to get the aircraft out of the dive—that was difficult enough—and then tried to engage the automatic pilot, but the damned thing wouldn't work. Well, that looked nice, leaning over a dead pilot, precariously holding the Hudson in the air, having to go back over 300 miles and land the aircraft! It seemed quite impossible. The rest of the crew came to my help, dragged the dead pilot out of his seat and helped me to get into his place. And then for home. It wasn't easy, but finally we made it, and when we saw an airfield near the coast we were very glad.

"But now the worst part, landing 10 tons of aircraft at a speed of 100 miles per hour. So, sweating heavily, we tried to make our first landing run, undershot and tried once again. Twice it was unsuccessful—the Flying Control people must have had kittens by then—and then the third time we were lucky, and managed to make a fairly decent landing. I felt like kneeling down and kissing mother earth. Can you imagine how I enjoyed the first pint of beer?"

In this way, solidly, conscientiously, with heroic determination, the Dutch took their part.



TO KEEP THE SEA-WAYS CLEAR. Dutch mechanics overhaul one of the Fokker seaplanes which, manned by Dutch naval air personnel, shared in the vital, unspectacular, but often dangerous work of Coastal Command.

In December 1940, No. 320 Squadron gave up its Fokker floatplanes for Hudsons, and was merged with Squadron No. 321. The Battle of Britain was over. An island had been saved from invasion, not only by the efforts of its own people, but by the efforts of so-called defeated peoples from the continent of Europe; it had been saved not only by the Polish fighters, one squadron of whom had claimed 150 victories, and another of whom had destroyed 28 enemy aircraft in three days, or the equally successful Czechoslovaks, but also by the Belgians and Dutch, who had proved, as in boxing, that the light-weight can hit very hard. They, too, were part of the victory.

To-day the Dutch are fighting from the

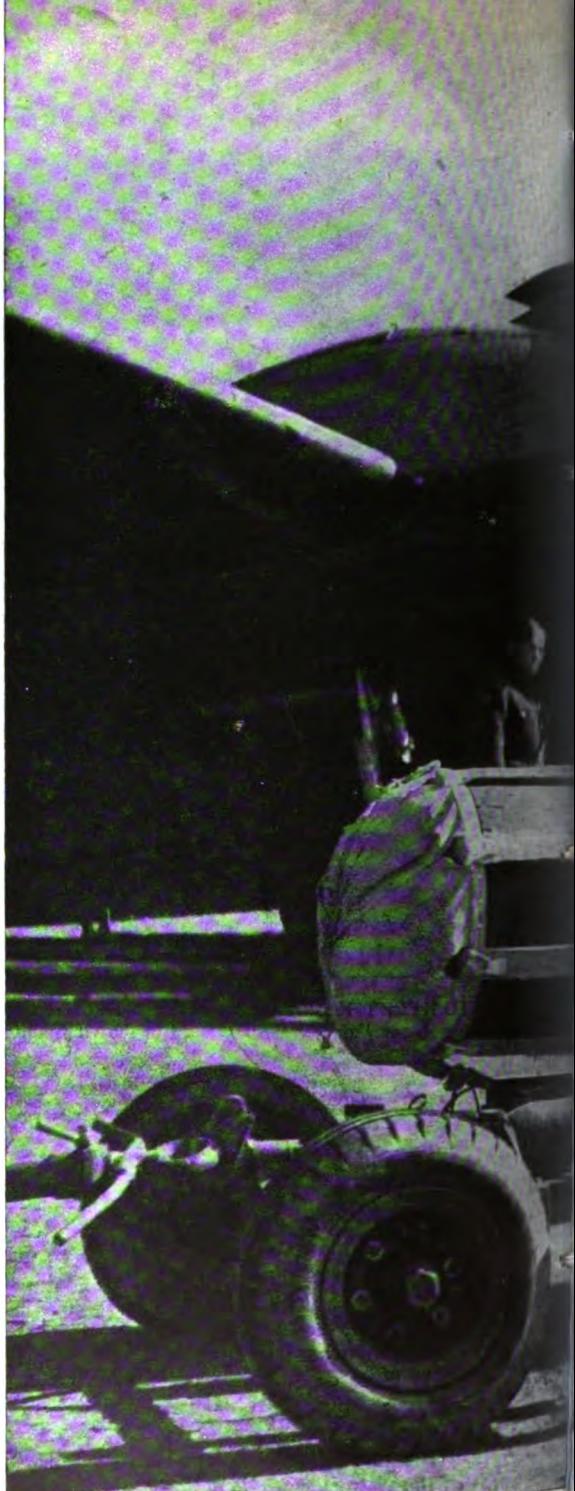
northern shores of France to the Indian Ocean. Their fighters were over Dieppe, adding glory to their records. In the Pacific Ocean, after the cataclysm of Pearl Harbour, Dutch pilots fought gallantly in the defence of Singapore and Java. When they fell, some of these pilots escaped to Australia, where they formed the nucleus of a Netherlands East Indies Squadron, while yet others made an epic flight of 3,000 miles from Western Australia to Ceylon, where they reformed as a Flying Boat Squadron, and were quickly operational once more. Increasing numbers are now finishing their training, and will soon be assembled with the other Dutch squadrons ready to take part in the fight for the liberation of their country.

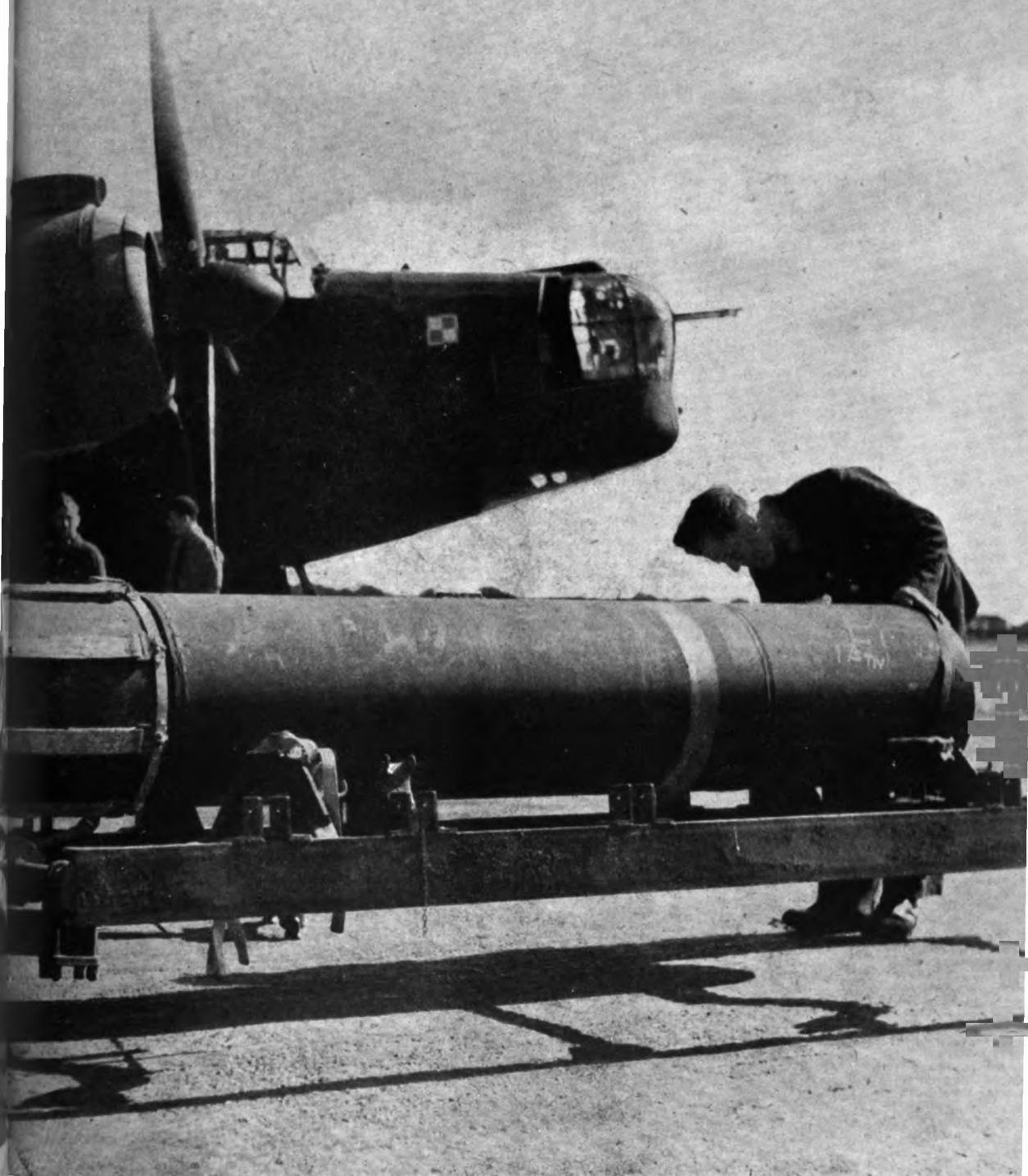
4. The Bright Strings of Vengeance

BY THE TIME the Battle of Britain was over, two other victories had been won; and a new phase was to begin. At the school-desk, Poles, Czechoslovaks, Norwegians, Dutch, Belgians and French had won the victory over language; in the little publicised world of training and equipment they had won, and were still winning, the victory of weapons. Not only in this country, but in the flying schools of the Dominions, they were trained side by side with British airmen to fighting fitness. To speak English in order to train; to train in order to fight—without these steps their unfailing courage and resolution would have lacked practical expression.

The new phase had even then begun; the Battle of Britain had simply overshadowed it. It was the offensive by Bomber Command; the offensive in which the Allied Air Forces had begun to take part in September, when the first Polish bomber air crews, flying the Battles of which we now never hear, had bombed enemy shipping in the harbour of Boulogne. Two squadrons had taken part in this operation, Nos. 300 and 301, and both had been formed in July of that year.

Back in England, at the beginning of August, the first Czechoslovak Bomber Squadron, No. 311, facing difficulties that had not confronted Czechoslovak fighters, many of whom were now veterans in war, had been formed and equipped with Wellington aircraft. By August 18th its first air crews were ready for operational training, and barely two months later, on October 10th, it carried out its first operational flight. Armed with eight 250 lb. bombs each, the Wellingtons had instructions to attack the marshalling yards at Brussels from a height of 1,000 feet. The weather for the operation was very bad, and low cloud obscured the city. In consequence the Czechoslovaks were forced to





TAKING THE FIGHT TO THE ENEMY. This massive mine is about to be loaded on to a Wellington of a Polish bomber squadron. Allied squadrons have played their part in the ever-increasing offensive of Bomber Command against German industry and shipping

go down to less than 300 feet before releasing their bombs.

The *Daily Mail* wrote:—

"Planes dived from clouds right in the face of heavy anti-aircraft fire and calmly crossed and recrossed the target as many as four times whilst taking a precise bombing aim. This squadron had a particular reason for making a perfect success of its job—it was the Royal Air Force Czechoslovak Squadron having its first chance to strike at the Nazis."

On that first bombing operation by the Czechoslovaks, probably about 20,000 lb. of bombs were dropped. It was the beginning. As time went on, this Czechoslovak bomber squadron began to go not only to Belgium, but to Germany, whose rulers had once talked very glibly across the Czechoslovak border about self-determination, and to Italy, whose now deflated Duce had invented the word Fascism itself. The Czechoslovaks also visited other German-occupied territories. These journeys, gradually mounting up, gave them the opportunity to drop, in about eighteen months, just under 3,000,000 lb. of bombs. On Brest alone, which, during its occupation by the warships *Scharnhorst*, *Gneisenau* and *Prinz Eugen*—known to bomber crews as "Salmon and Gluckstein" and "the Tadpole"—was then perhaps the mostly heavily defended port in the world, the Czechoslovak squadron dropped 342,000 lb. of bombs.

Other ports, notably Kiel and the submarine base at Lorient, were also attacked by the Czechoslovaks. These ports were highly important. By 1941, indeed, the war had become and was becoming even more a battle of ports. By the dislocation of port facilities, ship-building yards, idle capital ships, submarine bases, naval dockyards, each side sought to injure, at its source, the sea-power and merchant-power of the other. Similarly, the destruction of port bases could amount, in terms of shipping and potential shipping destroyed, to a naval defeat on a fair scale. Ports therefore became more and more points of concentrated anti-aircraft defence, and the visits to them by attacking aircraft more and more difficult and dangerous.

The Czechoslovaks, therefore, like the Poles and their British comrades, did not attack without considerable losses. In spite of this they have maintained a number of squadrons out of all proportion to their total manpower—simply because the percentage of flying men among the

escaping Czechoslovaks was itself so large—and they have continued to maintain all these squadrons, with one exception, with their own Czechoslovak ground crews. They have fought with tenacious skill wherever they have attacked; by day and night, against raiding enemy bombers, fighters or submarines. As their bomber strength and experience mounted they were proud to take part in the 1,000-bomber raids on the great cities of the Rhineland and the Ruhr. In the huge unprecedented raids on Cologne, Rostock, Bremen and Hamburg, the Czechoslovaks had a most distinguished part.

All this time the strength of the Poles was growing. The coloured map of Europe with its bright strings of retribution was becoming more and more interesting. From the Atlantic coast of France to the Baltic ports of Germany, the strings were growing closer and closer together into a solid fan. This fan represented, in 1941, the dropping of a total load of 1,200,000 lb. of bombs on German and German-occupied soil. But in the first six months of 1942, it represented a total load of nearly two and a half million lb. of bombs. The Polish power to hit back had been doubled and doubled again.

These repeated operations gave the Polish bomber pilots, in time, an interesting idea. They decided that it would be fitting that, whenever a Polish airman had made three trips to a German city, he should receive the freedom of that city. Thus a Pole, making his third trip to Bremen, would be given the title, *Obywatel Honorowy Miasta Bremen*. The appropriate rites would be conducted at breakfast on the morning after operations—most probably in marmalade.

During 1942, more and more Poles received these honorary freedoms of German cities. More and more crews made their third trips, and then others, to the great cities of Bremen, Essen, Hamburg, Cologne. More and more strings were added to the coloured fan. Now, at last, they felt that they had a positive task. The defence of Great Britain, in which many of their compatriots had played a splendid part, was only part of the immense plan of the war. To carry the war into Germany, to demonstrate to the citizens of Cologne and Bremen some of the experiences of the citizens of Warsaw, to make war a horrifying, positive and striking evil whose evidence could be smelt in the house, the factory and the street—all this seemed to the Polish

bomber crews a clear course towards its end. Poles have been at war with Germans for something like a thousand years. It is consequently natural that they should feel they know them well.

The Poles, therefore, were not only proud, but extremely satisfied, at their part in these enormous raids of the summer of 1942, for by it they were carrying the answer common to all the disinherited nationals of Europe—that the subjection of one nation by another is ultimately an impossible thing. A nation cannot fight with abstract qualities like faith and honour and resolution; but its people can endure by reason of them. And if they can endure long enough and can somehow support that resolution and honour and faith with tanks and guns and aircraft and bombs, they can accomplish a miracle. To the Poles the great bomber raids were the first part of that miracle. It must also have seemed an uneasy miracle for the people of Germany. For who in Germany could have guessed that, three years after the crushing defeat of Poland, a resurrected Polish Air Force would raid the cities of Germany in greater strength than it possessed in 1939?

All these great raids, and many others, were not made without loss. Though not comparatively greater than British and other Allied losses, they were nevertheless considerable. And since it is the story of the returning aircraft, and not the aircraft lost, that the public almost invariably hears, the story of Polish courage in the nights over Germany will never be fully written or known.

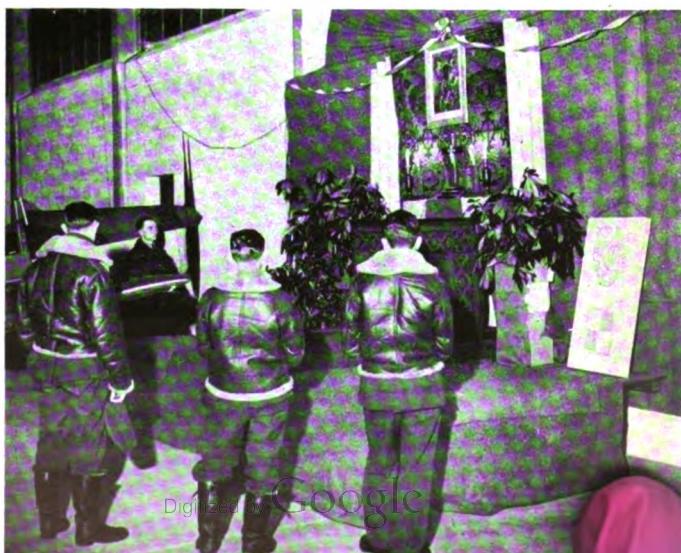
But the stories of those who do return are also great. Behind the big victories, which are world news, lie the little victories, which time turns into something like local legend. So the public probably read, after one Bremen raid, the story of five Polish Sergeants and a Polish Flying Officer in a Wellington.

That night this Polish bomber crew had just dropped their bombs over Bremen when they were attacked by enemy night fighters. From astern and then starboard below, came a Ju. 88, from port an Me. 110. The Wellington, though returning fire, was badly damaged. Four of the crew were wounded. At 3,000 feet the situation was extremely grave. The wireless operator and the second pilot lay seriously wounded on the floor. The observer was shot through the

chest. There was no inter-communication with the front or rear gunners. The situation in the aircraft was incredibly bad: the flaps and undercarriage were down, the rudder shot away, one engine damaged, petrol tanks shot through, the radio out of order. There was fire on board, and of all the more essential flying instruments the altimeter and the compasses alone appeared to be working. The aircraft crossed the Dutch coast at 300 feet. Out at sea it had a narrow escape from an enemy convoy. Then it sighted one of our own convoys with its barrage balloons flying. Seeing the aircraft in distress, the foremost ships increased speed; the rest slowed down. And so the aircraft, rocking and heaving above the sea, passed through. When it finally reached base two of its crew died, two were taken seriously wounded to hospital.

Behind all such exploits lies a single inspiration. It is perfectly expressed in an inscription that hangs above an altar in the hangar of a Polish bomber squadron. Almost all Polish airmen in this country are Catholics. Their altar of devotion is rightly very close to the scene of their action and sacrifice. In the huge dark hangar, among the black bombers, it shines with its inscription that in its profound and touching simplicity is the voice not only of Poles, but of all the disinherited peoples of Europe everywhere: "*Lord, please bring back our country's freedom.*"

ON THIS ALTAR, shining in a Polish hangar, is inscribed the prayer of all the disinherited peoples of Europe—the prayer that their freedom may be restored.





GREECE LIVES in the spirit and deeds of such pilots as this—men who, after valiantly defending their country against the Luftwaffe, escaped to form Greek squadrons of the R.A.F. and take part in the victorious Middle East campaigns.

5. Wings for Freedom

TWO OTHER COUNTRIES in Europe had now joined the dispossessed. Greece, which had waged against Italy a campaign of such heroic success that the thrill of it touched the world, and Yugoslavia, peopled by hardy romantic peasants in a territory of black mountains where a magnificently organised war against Germany and Italy still goes on, had at last been occupied by a Germany still seeking strategic Lebensraum. To the Grecian war it had unfortunately not been possible to send more than a few squadrons of British aircraft, so that the Greek story became, like the Yugoslavian story with it and the stories of Czechoslovakia, Belgium, France, Holland, Norway and Poland before it, the old story of faith without arms.

Greece and Yugoslavia were terrorised, as countries north of them had been terrorised, by an exhibition of robot armed force. Belgrade was treated to the savagery that had struck Warsaw and Rotterdam, London and Coventry. The way of the Greeks and the Yugoslavs was as clear as the light of morning: to go on resisting, in secrecy or in exile, long after it had seemed impossible. So, inspired by these ideals, two more small countries, passionate in national idealism, joined the Poles, the Czechoslovaks, the Dutch, the Norwegians, the Belgians and the French in the fight for the right to be left alone, in freedom, to live their national lives. For the Yugoslavs, chances of escape were certainly not great; but from their seaplane base at the beautiful little town of Kotor, in the great fjord-like harbour on the Dalmatian coast, a few crews managed to get away. From there they reached Egypt, where they were able to carry on the fight alongside the R.A.F., using their Dornier 22 seaplanes to help in submarine patrols over the Mediterranean. Even to-day a few Yugoslav patriots are still escaping to join their countrymen and help expand the Yugoslav Air Force. These men are training on British

aircraft and will be formed before long into operational units.

The Greeks who escaped to British territory proceeded to do in the Middle East what six exiled nations had already done in Great Britain. They re-formed, re-equipped, re-trained themselves; they began to learn English—which, thanks to a Scots teacher, many of them spoke with a strong Scottish accent; they were becoming a new striking force, part of an infinitely stronger organisation than the little Greek Air Force that had vainly resisted the Luftwaffe with such notable courage. Greeks who had been evacuated from Greece and Greeks who had made their own escapes, Greeks from Egypt and all over the Middle East, now joined themselves together with the ardent spirit that had for so long defied the Italians. Among them was a young Greek soldier who had been wounded three times in the Albanian campaign, whose brother had been killed, and whose ship had been sunk by bombs soon after leaving its Greek port. As soon as he reached Egypt he demanded transfer to the new Greek Air Force. His spirit was typical.

As these new Greek units became trained, new Greek squadrons were formed. A Greek squadron of Hurricanes soon began to protect Mediterranean shipping and to raid convoys. A second squadron, equipped with Blenheims, made submarine patrols, long-range reconnaissance. Many of these Greeks, now flying British aircraft, had already flown, like many Poles and Czechoslovaks, 2,000 or 3,000 hours. They held Greek decorations. Now they began to earn British decorations. A Wing Commander dive-bombed enemy airfields in the Iraq campaign; the exploit earned him the D.F.C. While these things were happening, more and more Greeks came to join the new Greek Air Force. Soon there were enough of them to make it possible for a complete Greek depot to be formed. Greek technical officers, administra-

tion officers, medical officers, Greek N.C.O.s and ground staff—they began to prove, once again, that national ardour cannot be squeezed to death between the fingers of aggressors. They, too, had only one object—a living Greece.

So two more exiled Air Forces were joined, still fighting, with the R.A.F. And while they were escaping by sea and air to Malta, Crete and the North African mainland, things of importance were still happening in Britain.

On November 7th, 1941, the first Free French Squadron, No. 340 Fighter Squadron, was formed. It had been nearly 18 months since the first Free French pilots had reached England. The Poles had been able to form their first exiled squadrons in about nine months, the Czechoslovaks in about ten months, from the outbreak of war. The Dutch, in spite of defeat

in the spring of 1940, had been able to re-form and fight by the summer.

The position of the French was not easy. Metropolitan France was a big country, slit in half. The French Empire was colossal, occupying, as a glance at the African map in particular will show, rich and strategically important areas of the world. A divided France, with a divided and bewildered Empire, without certainty of leadership, was a political tool of dangerous importance. The defeat of France had led to a disruption: it was the vortex of the war. Into this vortex, in the summer of 1940, Great Britain might have been dragged down.

It was therefore immensely to the credit of the de Gaullists that they should choose to fight from England, where the cause was by no means certain of success, rather than remain under domination at home. It was significant also that they gathered together in England under the emblem of the Croix de Lorraine, first adopted as the badge of the *Forces Françaises Libres* in 1940. That dual cross, in no sense a national emblem or part of the national flag, expressed precisely the same spirit of liberation once expressed by Jeanne d'Arc, who, too, carried the Cross of Lorraine. It had a history, in France alone, of 700 years. Brought from the East in 1241 by Jean d'Alluye, it was kept at the Hospital for Incurables at Bauge. The first Duke of Anjou, Louis, had a great devotion for the relic, and introduced it into the Coat of Arms of the House of Anjou. At Anjou it is part of the splendid tapestries of the Apocalypse and several decorative themes in the cathedral. When René, Duke of Anjou, became Duke of Lorraine in 1431, after his marriage, he incorporated the double cross into the coat of arms of the new Duchy. From that time onward the cross, known formerly as the Cross of Anjou, became the Cross of Lorraine.

So on a spring day of 1942, exactly 700 years after Jean d'Alluye had brought the cross from the East, you might have seen a burly Frenchman, pipe in mouth, in the dark blue uniform of the French Air Force, doing his best to make a rough design of the cross in stones, on a ground of sand, outside the dispersal hut of the first Free French Squadron in England. With typical French provincial love of a piece of property, this Frenchman had neatly lined out the path with stones on either side and had painted



YUGOSLAV AIRMEN, after the fall of their country, flew their Dornier seaplanes to Egypt and operated with the R.A.F. in anti-submarine patrols over the Mediterranean. They are now being trained on British aircraft.



THE COLOUR AND SPIRIT OF FRANCE were carried to Britain by French patriots. Men of the French Fleet Air Arm work as ground staff on the airfield from which a French fighter squadron operates.

them white. The cross, too, was painted white the sand was raked smooth. Plump, dark, pipe-smoking, this Frenchman might have been any French provincial artisan painting up his garden anywhere from Dieppe to Bordeaux, from Toulon to Morlaix, on a warm spring day. All about him, on the perimeter track where Spitfires were lined in readiness for sweeps over France, Frenchmen from all corners of the earth were also in process of making a little piece of England as much like France as they could.

These French patriots had come not only from all parts of Metropolitan France, but from the most distant parts of the French Empire. Most of those from France itself were flying men ; they had fought in the air in France. Perhaps they were part of that contingent of flying Frenchmen who had escaped with a young priest

in a fishing boat—the young priest feeling it his duty to embark with them almost solely because he felt the boat must go down. Perhaps they were part of another little contingent who had also come by boat, nailed down under its planks until they were far out to sea. Among them were suave-faced city men from Paris, English-looking Bretons from the Atlantic coast, dark Provençals from the South.

But most of the men there, the ground staff, were not from France. They were men of the French Navy. They had come from Africa ; from as far south as Tahiti and as far east as Indo-China. In sailors' dark blue tam-o'-shanters, with scarlet bobs, they played vociferous and excited games with pennies in the warm spring dust. As they played, a lorry drove up and braked on the perimeter, raising dust, and



UNDER THE CROIX DE LORRAINE, the emblem carried once by Jeanne d'Arc, these young French pilots fight with the daring and gaiety for which their country is famous.

there developed instantly one of those voluble and pantomimic arguments between driver and bystander that are as much a part of French national life as *vin rouge*, coffee and the smell of onions. This argument caused intense and serious interest until finally it was seen to be less real than funny. After which the lorry drove off, the driver shouting sulkily back through the open window, and the tam-o'-shanters continued tossing pennies in the sunshine.

Here, without doubt, among the Spitfires painted brightly with the Croix de Lorraine, among the smell of French cigarettes, and the games that should have been played on the dusty quays of St. Malo or Brest or Marseilles or Casablanca or Toulon, France was alive. These Frenchmen, refusing to be Anglicised even in England, were demonstrating simply and forcibly that you cannot squeeze nationalism to death as you squeeze a maggot between your fingers. The essential odour, colour and spirit of French life have been carried to and kept alive in the most unlikely parts of the world. They even continue to permeate parts of it, most notably Canada, which has long ceased to be a French possession. There was no better evidence that this spirit was still alive than in the Frenchman making his Croix de Lorraine in stones and the sailors gambling with pennies by the waiting Spitfires.

But that spring, almost every day, this group of Frenchmen provided other evidence. They flew their Spitfires—one painted not only with the Croix de Lorraine, but with a saucy Donald Duck, designed for it by Disney himself—in a large number of offensive sweeps, in one of which no less than 600 aircraft took part, over their native country. In this way, helping to pin down a large Nazi fighter force on the airfields of Northern France, many of them saw their native land for the first time for nearly two years. One, it is reported, even shot down an enemy aircraft within sight of the roof of his own French home.

In one of these operations, "A Squadron, 12 Spitfires IX, flew to mid-Channel where it climbed, reaching the mouth of the Somme at 11,000 ft. B Squadron were on the right of A Squadron, which flew down the Somme at 15,000 ft., skirting the forest of Crécy. Some accurate heavy flak was directed from Drucat at B Squadron and Blue Section A. The

wing turned right, orbiting the airfield where two aircraft were seen taxi-ing out to take off. They turned right again, and after reaching Le Crotoy, heard a warning that six enemy aircraft were behind. Nothing was seen by A and, as B could not engage, the wing turned to come out. A were now in front and on the left, and turned to take their position behind B, being at 15,000 ft. At this moment, two aircraft were seen at 3,000 ft. below by Comm. Duperier (Red 1), who, with Red Section, dived and found three F.W. 190s flying N.W. towards Le Touquet. Combats followed, as a result of which one enemy aircraft was destroyed by Comm. Duperier, the pilot baling out. Comm. Duperier also attacked another F.W. 190 flying in the same direction, and shot it down near Le Touquet, the aircraft crashing near the airfield. Six enemy aircraft were then seen diving on the squadron from 3,000 ft. above. Several attacks were made by these, two of which attempted to attack Red 1 from the rear. They were, however, prevented from carrying out their attacks by Adj't. Gouby and Adj't. Buiron, who, in the course of defending their leader, each damaged an F.W. 190. The aircraft damaged by Adj't. Gouby had the engine cowling shot away, and may have been destroyed.

"About the same time when Red Section first attacked, Blue Section saw an F.W. 190 1,000 ft. below and four F.W. 190s 3,000 ft. above, flying in a wide orbit from Berck to Cayeux. Blue leader decided to attack the aircraft below, which was probably destroyed by him and Blue (S/Lt. Moynet), who saw that the tail unit had been blown away by their fire. When half-way back to Beacy, four aircraft were seen following at a great distance, but they soon gave up the chase. All aircraft landed at base by 15.55 hours, when it was found that Adj't. Gouby's aircraft had been hit in the wing by an m.g. bullet, and S Lt. Kennard's aircraft had been slightly damaged by A.A. fire."

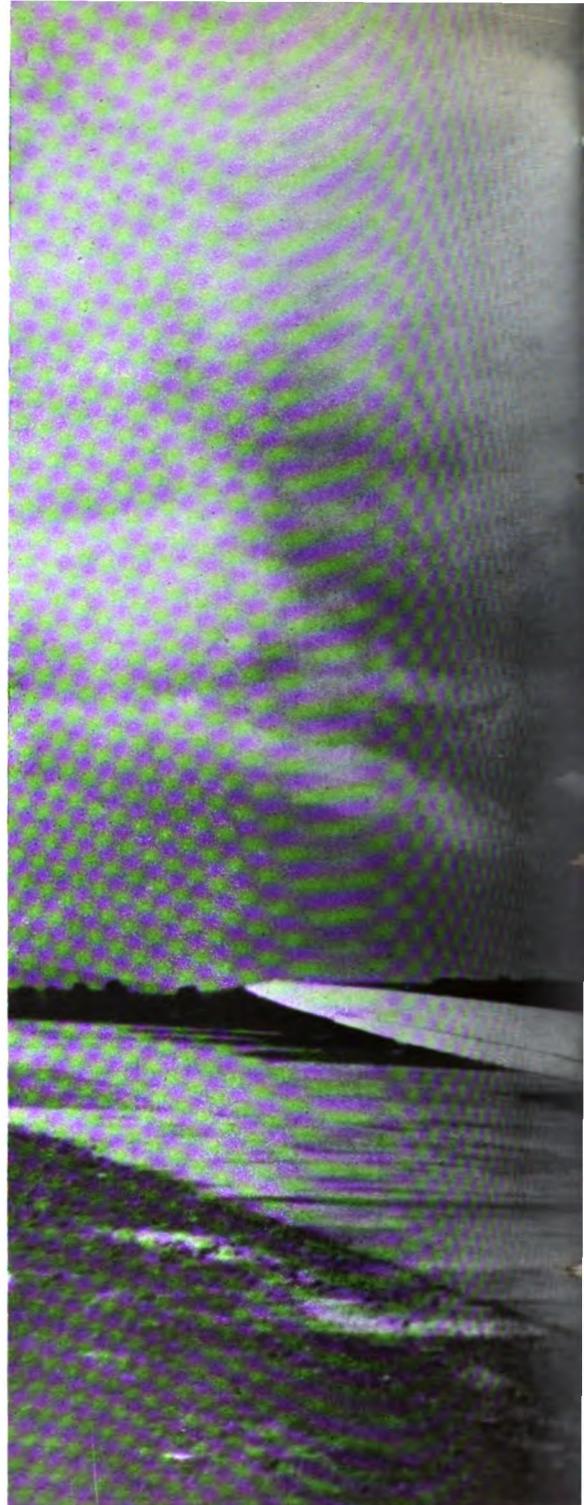
In this way, by July of that year, nine months after the formation of their first squadron, Free French pilots of Fighter Command had succeeded in shooting down 34 enemy aircraft in combats over Europe. Meanwhile, French pilots were at work in Syria and the Middle East, where the "Lorraine" and "Alsace" squadrons fought with great success. They were also doing co-operation work in French Equatorial Africa.

6. Circle of Faith, Circle of Arms

IF YOU put the point of an imaginary pair of giant compasses in Berlin and place the other point in Iceland you can draw, going southward, an interesting circle. It will pass the British Isles, cut through French Morocco, Algiers, Libya, Egypt, Syria, Iran, the Caspian Sea, the great Central Russian plain, Stalingrad, Moscow and Leningrad, and will ultimately emerge at Murmansk. Inside this circle lie Germany, Italy, Austria, Rumania and half a dozen subjected nations; all along the edge of it, closer and closer, more and more powerful, lie the forces of opposition. In that circle lies the strategy of the European war.

When the war began there was no circle. Confused and bloody spots of savagery broke out at disconnected points on the map of Europe: Poland, Norway, France, Belgium, Holland, finally Greece and Yugoslavia. There was a bloody spot over Britain. As the war progressed an inner circle was formed, acquired and dominated by Germany. Out of this inner circle, with its horrors of persecution, the Gestapo, the hostages, the bloody curfews, the savage reprisals, there escaped in ones and twos, in hundreds, sometimes in thousands, the men who are the subject of these pages. They escaped to help form, in time, the outer circle as it stands to-day. This circle is no longer symbolic, but real. It is not simply a circle of faith, but of arms. Its power consists not in hope, but in ships, in Spitfires, in Wellingtons, Halifaxes, Lancasters and Stirlings, in Mosquitoes and Bostons, in Hudsons and Flying Fortresses, in men and guns. The encirclement of inner Europe is no longer an indignant myth of Nazi propaganda; it is no longer the retaliatory encirclement of Great Britain. It becomes a fact of geography, men and arms.

The men of the Allied Air Force are relatively.





DESIGN FOR ATTACK. The Allied Air Forces are an integral part of the great weapon which has now been forged to strike at the enemy's heart. A Spitfire V, of a Czechoslovak squadron, about to take off on a sweep against hostile airfields.



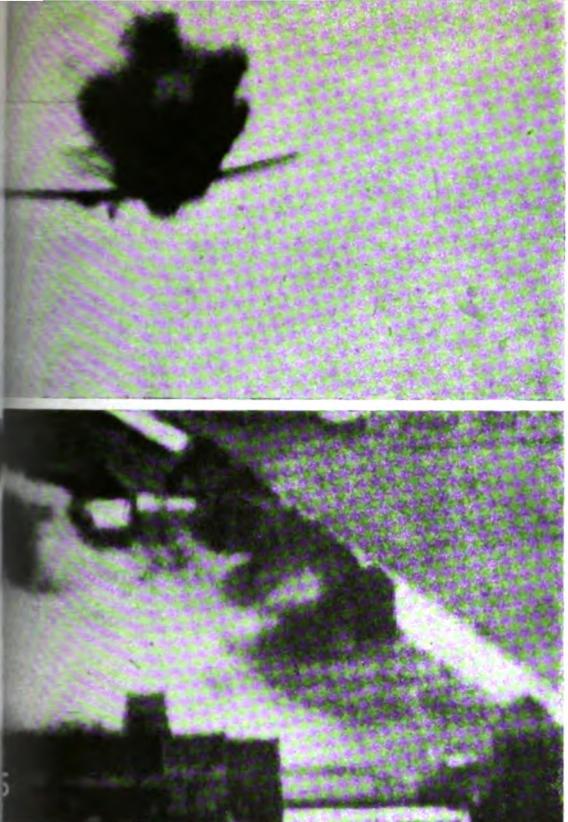
ATTACK IN PROGRESS. A Belgian pilot, flying a Typhoon on offensive patrol, brought down a Ju.52 near his own home town. (1) "I climbed and let him have it. . . ." (2) "Only my port guns fired, but it was enough. . . ." (3) (4) and (5) "The starboard engine of the Hun caught fire, and pieces flew out of the cloud of smoke. . . ." (6) "He went down and broke in two behind a small building."

in numbers, a small part of that completed circle, now powerfully reinforced by the United States. Their greatness and their achievement are not, however, in the accomplished thing, but in their part in its accomplishment. Their greatness lies in the fact that, when the war was confused, desperate and even on the verge of being lost, they decided to make the immense personal sacrifice needed for them to remain actively fighting. Their greatness lies in the fact that they rejected personal safety and commitments for a voluntary and dangerous exile; in the fact that they left families, parents and friends under enemy occupation and persecution, knowing that they might suffer because of them, simply for the uncertain chance of being able to avenge, in the air, the defeat of their native countries.

The exploits of flying men and of aircraft tend, as time goes on, to repeat themselves. The exploits of Spitfires run to a pattern; the long journeys of Catalinas over the Atlantic become as

alike as the voyages of ocean liners. It becomes harder and harder to extract, from thousands of combat reports, a new exploit more illuminating and heroic than one which has already happened. It becomes easier to take the great event of yesterday for granted. For this reason the exploits of the men of the Allied squadrons may seem to be of the same pattern as those of other men. But theirs, in fact, was always a different achievement. It demanded always an extra personal sacrifice; it asked more of the imagination; it was full of potential distress, not only for the man himself, but for those he loved most at home. It demanded an endurance that could not be alleviated by family meetings, the family fireside and all the comforts of home. It demanded all, and always, the patience of the exile.

What of the future? The result of this great sacrifice cannot be temporary. The infiltration into the insular life of Great Britain by thousands



They have been into British homes, have become familiar with British customs. They have married British girls. Already some of them have families. The roots of Scandinavia and Central Europe reach out and take new life in the English midlands, in Edinburgh and London, in the mountains of Scotland and Wales, in the blitzed cities. From America come more men, to find in English valleys the very place-names, sometimes the very idioms, of their own country. These men are taken into British homes, given British hospitality. Men from Texas and Colorado, born to immense distances, fly over a little country where the landmarks are like a tangle of loose stitches. Men from the Middle West help to gather in the harvest of English corn.

If there is to be a better international understanding in the future, its roots are here. They are the roots of living men. Wars are won on the battlefield, on the sea and in the air; they are lost at the conference table. In this war, more than any war in history, nations have endured a common experience. The bomb falls on the home, from Oslo to London, Warsaw to Plymouth, Belgrade to Liverpool, Rotterdam to Coventry, Stalingrad to Canterbury. The cathedral, the house, the flat, the *café*, the hospital, the school—none of them is inviolate any longer. There have never been so few non-belligerents, so few neutrals, as now. We all make the common sacrifice.

The story of the Allied Squadrons, small perhaps against the complete epic of the twentieth-century revolution, is an important part of that sacrifice.

In 1940, Mr. Winston Churchill made to France the offer of a Franco-British union by which the citizens of each country would become citizens of the other. To-day, as the Allied Squadrons help to account for the 170 enemy aircraft shot down over Dieppe, as Poles become "honorary citizens" of the German cities they bomb in their Wellingtons, as the Norwegians rise from their small beginnings to second place in numerical strength, as Czechoslovaks, Belgians, Greeks, Dutch, French and Yugoslavs carry on the air war from the shores of the Mediterranean to the fjords of Norway, there is being made in the air, if we care to see it, the possibility of a new union on earth. It could be a union of men, not words; it could be the new inheritance of the disinherited.

of young Poles, Czechoslovaks, Norwegians, Dutch, Belgians and Frenchmen must do something to affect that life. In peace we talk of war; in the middle of war we begin to talk of peace. The plans for peace are often grandiose, vague and illusory. But in the presence of thousands of young foreign airmen in Great Britain we have a fact from which a new international understanding, idealistic yet free from antipathetic ideologies, might grow to benefit the world. These men have lived in Britain and, while fighting for their own countries, have fought for Britain and the ideals which will live while Britain lives.

We on our side must never forget this. But these men could never have fought here without British aircraft, flown from British airfields, built by British hands and brains and made by British coal and steel. They, too, on their side, will never forget.

Living in Britain, these men have seen our life.



... "THEY ARE COME AMONG US WITH PURPOSE IN THE EYES, WITH A SMILE ON

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For help with the text and photographs, the editors are grateful to the Great Western Railway, the London & North Eastern Railway, the London, Midland and Scottish Railway, the Southern Railway, the London Passenger Transport Board, the Grand Union Canal Company, the National Fire Service.

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ADING THIS BOOK. IF YOU HAND IT IN TO THE NEAREST POST OFFICE, IT WILL GO TO THEM

Transport is in the

CHAPTER ONE

IT was on Liverpool's bad night of the 3rd-4th May, 1941, the middle of the bad week. The moon was in its first quarter. The Luftwaffe must have heard that some interesting cargoes were in the Mersey at that time. On the railway down at Breck Road there is a signal-box, and the signal-man got his first tip that something unsavoury had been hit when he heard the familiar scream, and the next moment was blown off the top of the signal-box steps down into the embankment. An ammunition train which was standing in the sidings had been caught, and the contents were going off wagon by wagon.

Injured in the leg by his fall, the signal-man crawled up to the damaged signal-box. The glass had gone but the telephone looked sound. But the line was dead; it was down and out. So he limped outside to get help, and especially with the idea of having the people in the neighbouring houses warned and removed, before the full blast of the bombardment started. Meanwhile other volunteers had been called to go to the yard.

There were a shunter, a couple of goods guards, a driver and a fireman—a very representative and well-balanced team when you



study it. A young shunter used to chasing trucks, choosing the exact moment for his pole, adept and quick among the signal wires and points, with eyes at the back of his head for the sudden on-coming train, is by nature a man who likes a nip of excitement; there is a ready-for-anything reliability about guards, a touch of the jack-of-all-trades in them; drivers are precise and expert, trained to be unflurried; and if, as one suspects, there is

Battle



more temperament in firemen, it is of the go-anywhere, do-anything kind.

Up the siding, using the lines of wagons in the siding as a screen or a system of deep trenches, these men went in the darkness towards the exploding train. It was not a matter of single shells going off—some of the men say, anyway, that there were sea mines in the wagons—but truck loads at a time. Which wagon was going up next? Three other men,

working from another direction, met the party. One of the guards, as one would expect, took the lead. The driver and fireman brought an engine up, the guard began uncoupling the burning wagons as a push from the engine slackened the couplings—rather a nice shunting operation this—and the engine drew the wagons off.

The other guard went up to the damaged and empty signal-box to see what could be

done about the points, for the signal-man, as we have seen, was out on his own job. The guard had never set points in his life and the interlocking system is like a chess problem for those who do not understand it. He studied the diagram in the box and, at last, he hit upon the right combination. And so for the rest of the night the team worked, isolating the explosions, getting out whatever could be moved where the track was left. Bombs are bad enough, but this was like working in a barrage. They got 70 wagons of food-stuff safely out. In the morning, they saw they had been working on the edge of a crater, if you can call it that, 120 yards long. The official record begins with the narrative of one of the party, a model of understatement.

"Myself and the undermentioned therefore proceeded, with caution. . . ."

"I wish to report that on the morning of May 4th whilst on Home Guard duty the Goods Guard clerk came down to the lamp room" (where the engine and wagon lamps and the shunting lamps are stored) "and told us he had been informed that the ammunition train at Breck Road was on fire and asked for volunteers to try and save it. Myself and the undermentioned therefore proceeded, with caution. . . ."

So transport is in the battle. To the fighting man transport is not, indeed, the fighting arm and fist, but it is the blood circulating from the body into that fighting arm and fist. And if bringing down coal from Newcastle or sending the trucks of red ore through the Yorkshire junctions is not as exciting as a dog fight, there is something grave and momentous about this life-blood pumping more rapidly from the heart through the arteries and veins, as this country squares up to fight its enemies.

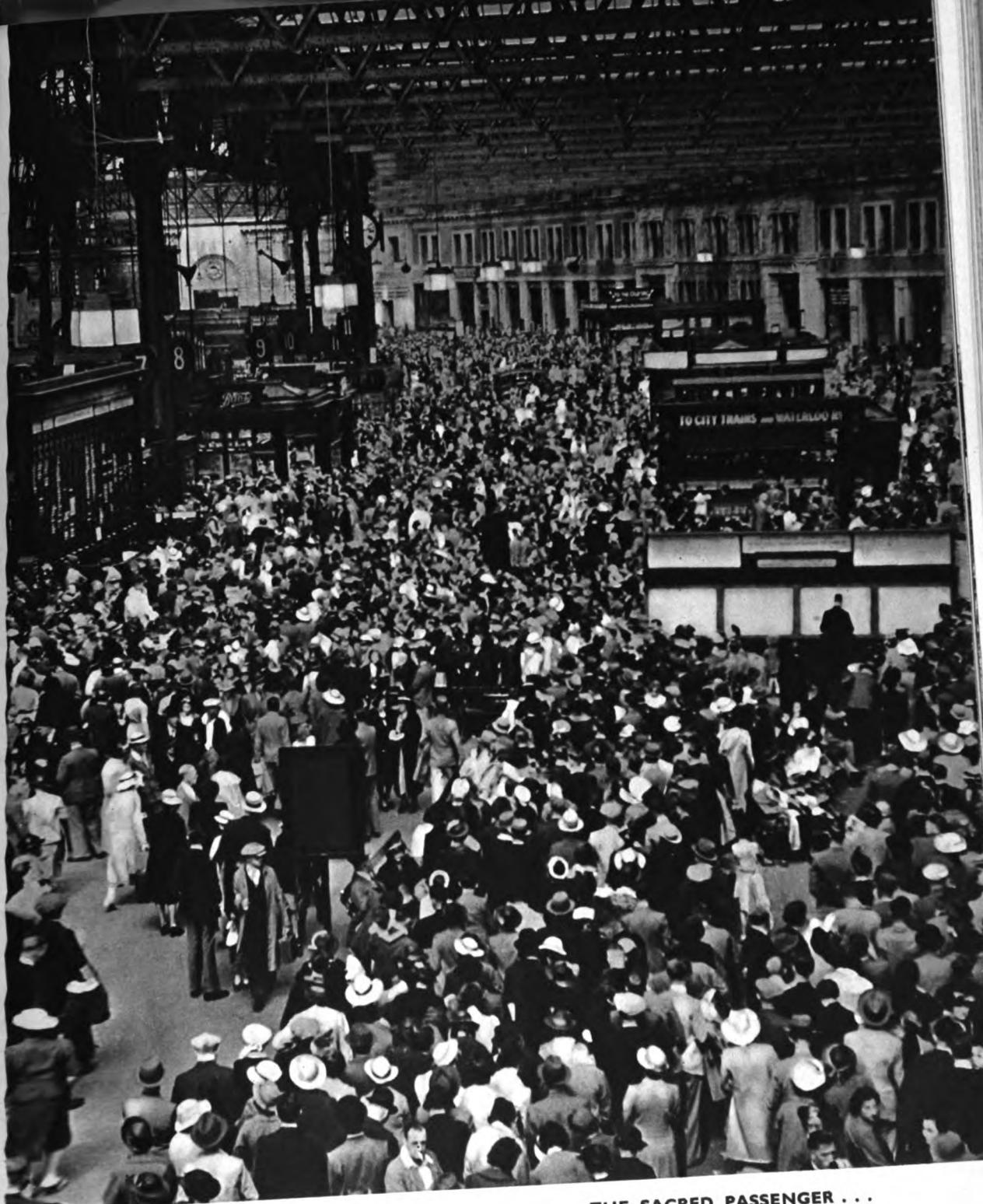
On 180,000 miles of British road, on 20,000 miles of railway track, on 2,000 miles of canal and on the waterfront of 50 principal ports, the circulation flows. In a war of workers

and technicians, transport is in action. Its strategy is not casual; it is planned. Planned at central and regional headquarters. Its hourly tactics are handled by the Harbour Boards, the 600 railway liaison officers with Government Departments and the Government road transport officers; in the noisy offices and loading bays of the road operators, in the Committees that have arisen out of the needs of the war, in the underground control centres, the goods yards; and, by no means last, by the driver on the train, the station-master at the junction, the lorry driver losing his night's sleep to get out on the road.

At first sight, there might not seem to be a large difference between transport in peace time and transport for war. A glance at the map soon puts an end to this impression. Look at the roads and railways. A military strategist would laugh at them. It is true they were adapted for war requirements, and maintained and improved in some cases with the possibility of war in mind. But the last thing they were planned for was modern war. They were built for the habits of free commerce and for pleasure. Before the war, charabancs thronged the towns and took holiday makers in thousands to the sea. Buses and trams went further and further out into the country to bring in to their work people who had gone there for pleasure. Traffic ran for the sacred week-end and the sightseeing tour.

Rival companies were scrambling for the job of carrying you to the Welsh mountains, the ruined Yorkshire abbeys, the Essex greyhound tracks and the lush hotels of the south. You travelled like a lord—and swore like a lord, too, when some convoy of lorries cut off the view you were looking at, or when some ugly thing backed out of a yard with a load of bricks and held up the stream of pleasure. And the quarrel between the road and the railways gave a zest to those journeys. You felt you were, indeed, the sacred passenger.

It is not intended to deride the sacred passenger, but merely to point out the conse-



THE SACRED PASSENGER . . .

quences of giving him his halo. If the passenger was sacred, the goods had to be profane. What happened to the goods? Were there any? There were. Millions of tons of them in a year, leaving the ports and arriving at them, not to mention the factories, the warehouses and the mines. On the railways, merchandise traffic was always the greater and more important: but so skilfully was it planned and so cunningly moved that the passenger might reasonably have supposed the railways existed mainly for his benefit.

There were serious oddities like the Broccoli Specials from the south-west, the Rabbit Specials from Devon, not to mention the Fish Specials, the Strawberry Specials, running in before sunrise to catch the markets, or the Horse Specials sporting along to Newmarket, Newbury and Epsom. A few of these trains ran in the day time—"Held up by a goods!"—you remember the outraged passenger's cry—and really, there was something boring in the sight of a goods train clanking its awful industrial nakedness in broad daylight. If by

Tanks



Bren-carriers



Gas for Balloons

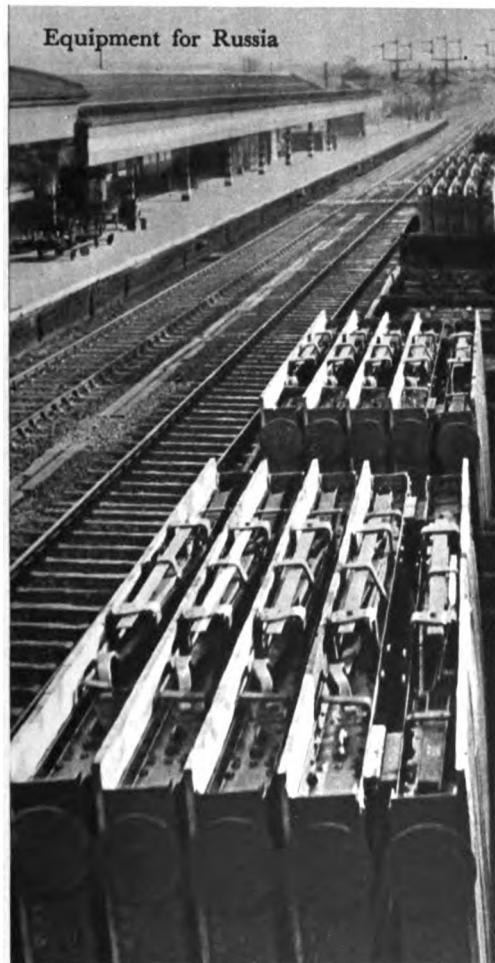


... GIVES WAY TO THE NEEDS OF WAR

accident the passenger had spent even a few minutes in the station-master's office, and had caught a glimpse of transport in its dressing room, so to speak, he knew that the companies regarded the goods traffic with the respect all workers feel for other people's work; but outside, on the platform, they were the servants of the travelling public. The passenger came first.

And here we come to the first act in the battle of transport; the reversal of that order. Deliver the passengers, yes; deliver the work-

ers and the troops, of course; but, above all, deliver the goods. That is what September, 1939 meant to British transport. To-day, you stand in the corridor of a train which is already an hour late because, when you get down to it, you have lost your halo. Coal, ore, steel, sugar beet, timber, meat, even soap flakes, wire netting and boot polish have become more important than you. The battle requires the constant speed, the continuous flow, faster loading, faster turning round, faster unloading, an acceleration of work and



Equipment for Russia



Coal

process. You were standing about to-day on a draughty platform or a wind-swept street, looking in despair at the clock, not because the confusion of war had muddled transport and made it forget its record-breaking traditions, but because, in fact, it is breaking records far more important than the old ones.

At this point we come to a matter which might at one time have been explosive: the question of co-operation between road and

ROAD HELPS RAIL, RAIL HELPS ROAD. One of the 500 buses from the Provinces which joined the London road-rail pool during the blitzes.



rail. Despite all the posters which used to entertain the passenger in the days when he had his halo, the tendency to co-operation between the young and older form of transport was already working before the war. The far-seeing knew it was the only way, and the war has confirmed that direction decisively. When road and rail worked together on the civilian evacuation and after Dunkirk, they were simply developing a technique which had already existed before the war, but one which became vital during the blitz and in the dispersal of industry that has followed. In London, where road and rail formed one complete pool, the railway companies would ring up the bus control officer in the middle of the night at his underground post and call for help. There were at one time 600 buses working for the railways in London; and on one spectacular evening the buses got 12,000 people out of Cannon Street station in four hours.

Towards the end of October, 1940, in the blitz, Londoners saw strange buses with their outlandish provincial colours, working down Holborn and Eastcheap with the cough cure and drapers' advertisements of the provincial cities on their bodies. They brought something of the zest of the "pirate" days to people mooching glumly among the obscene ruins of their reefs. An SOS had gone out all over the country and 500 of these "pirates" had come down in response. They ran for months and gradually through the spring and summer of 1941 they trickled back, each one bearing a laconic plaque "London 1940-41". That inscription will mean a lot as time goes on. And London has repaid that debt since by loans of buses to the provinces to help them in their difficulties.

In the same way you saw this unity of transport in the blitz when the lorries and motor coaches were doing the work of the evening trains among the crowded suburbs of London or in Liverpool's terrible week of May, 1941. There have been astonishing notices—astonishing, that is, in the light of pre-war history

—in which bus companies ask their passengers to go by train, and railways companies ask the passengers to go by bus.

These are not veiled hints to the passenger that nobody wants him. The true explanation is, once more, that transport is at war, not with itself, but with the common enemy; and that, as the flow of goods changes and increases at the ports, as the new factories get to work and the old ones expand, road and rail have to work together and relieve each other of the new strains. Men are called up,

once idle cross-country lines are congested, petrol is more and more reserved for those who can show they are doing war work and working with the team.

Co-operation is inevitable. The process which began with evacuation has gone on. It is useless getting the goods into the ports unless they are taken out of the ports; it is useless filling the factories and making new ones unless the workers are taken there and brought back with as few hours of travel as possible to add to their overtime.



SO THE LIGHTS OF PEACE CHANGED TO . . .

The First



... THE BLACK-OUT OF WAR

Great Tests

CHAPTER TWO

WHAT have been the main actions in the battle of transport? What have been the main crises which have started the telephone bells ringing in the offices, the hurried getting-together of committees and conferences with their minutes, their reports and their files? If you had the patience to wade through all those papers, you would be able to detect the jerks and collisions of ideas by which an industry has radically changed and quickened its habits and its strategy.

In the opening phases action followed pre-arranged plans which had been worked out to the last detail. The first crisis came with the handling of the first enormous evacuation of school children, invalids and business firms which packed the trains and crowded the roads in September, 1939; then, mobilisation and the moving of the B.E.F. with all its equipment to the ports of embarkation. A lull followed. The buses and trains went back into normal service. The Sitzkrieg was on. For the public the transport problem sank to the dimensions of the bother about petrol coupons, and was symbolised every Saturday night by Jack Warner's long-sighted warning, "Mind my bike".

Transport itself has painful memories of the Sitzkrieg. There were the first dealings with the dirty-faced black-out. The blitz comes and goes, but the black-out has been the lasting, the most hated enemy, an insidious medieval blackness which expressed more than anything else the attack on civilisation. Transport, which depends on the eyes of the man at the wheel, was having its first struggles with the black-out that autumn. By the winter, frost, ice and snow, the greatest freeze for forty years or more, gave an extra turn of the screw. Men on the roads and on the line look back upon the frozen black-out of the winter of 1939-40, with more venom than they feel about the blitz. There is an All Clear every day in the blitz; there was no All Clear for weeks in the great frost, and there has been no All Clear at all in the black-out.

Dunkirk was the next action. The lorries were not in this, but all the railways of England and many of the buses, too, were affected in that week-end. It was probably the greatest unpremeditated railway move in history. The brunt of the sudden pressure was borne by the south, but there were few places in England where traffic had not to be re-directed to deal with it. In September, 1939 the evacuation of the civilian population from the cities took place easily because it had been planned for months before the war. There was no planning for Dunkirk; or rather, a plan had to be produced in a day. And here transport met the great test, a test which was to become stiffer with the blitz and stiffer still every month that the war goes on. It had to break valuable regulations and give up habits. It had to improvise.

In the offices, the clerks had to ignore time-tables and invent new bus services and train services, to get the worn-out soldiers distributed. Some must have been astonished by their destinations. And when we say time-tables, we are not thinking of Bradshaw or the bus companies' guides; we are thinking of the mass of time-tables behind the time-tables, the hieroglyphics you see written up in the

locomotive sheds, the drivers' hostels, the yard manager's office, the charts of the big garages.

Perhaps the clerks and inspectors enjoyed this departure from routine. But, at the end of it all, there must have been an awed pause while the Jeremiah of every office asked, "How many passengers have we killed today?" The answer was, of course, "None". No collisions, no bones broken. Not even a hitch. Just a lot of tired clerks, not to mention drivers, engineers, guards, conductors, who would go home when it was all over and dream of awful accidents, ghastly messages from the signal-boxes and ironical communications from the garages. Dunkirk was just the beginning. There was plenty of invention to follow.

Britain rolls over and stands on its head

The next action was more complex. When war was declared the map of England became like a man beginning a somersault. Traffic tended away from the eastern ports to the western ones, in order to lower the risk to shipping and to save ship's time on the Atlantic cargoes. By the fall of France, we completed our somersault in a hurry. England rolled heavily over on to its western side and then stood on its head. It was no longer possible to send many convoys up the Channel because the Germans held the other side—not many convoys; still, as this was being written a London crane man was heard to turn down New Zealand cheese in a pub because "he couldn't stand the sight of the stuff"; he'd been unloading hundreds of tons of it.

But that isn't a fair picture. England rolled the best part of her weight to the west: look at the air-raid figures. Instead of spreading like a fan from the south and east, from London and Southampton (which had become dangerous), the system had to be put into reverse and spread from the Scottish and the western ports over the island. Think of that in terms of re-organisation to begin with. It

is a major operation. Branch lines carrying ten times more traffic than in peacetime, happy little junctions turned into little hells, lorry drivers working along unaccustomed routes—that is the sort of thing that has happened. And, in justice to all concerned, it should be added that that is the sort of thing for which preparations had been made. So far as could be foreseen, the pre-war plans covered diversions of traffic both from east to west and also from west to east, but these plans could only be completed and adjusted in the light of experience.

There is a lodging house for lorry drivers in Bristol kept by an Irish woman. At six in the morning the night drivers arrive for a wash and breakfast; and between six and eight, a tired woman who was frying fish up till one in the morning the night before, is now frying bacon and making tea for twenty or thirty breakfasts, while the drivers with their mouths full shout down the keep-fit exercises from the wireless. They are chiefly shouting about their journeys. It is eastward the whole time. Bacon to Newmarket, transformers to London, war material to Hampshire or Kent. The blow was sudden. The change has been gradual. You will find men—though not in the goods yards—who "haven't noticed anything particular", but once you get into the west and the north-west and the little grouse-shooting lines of the far north, the evidence is before your eyes. The goods manager looks at the daily wagon report and wonders whether he had better get through to London "to stir them up again", or phone Liverpool and beg them to cease.

Now that we have glanced at the main actions in the Battle of Transport, it is as well to see what happened at headquarters in September, 1939 and what has happened since. For an important and significant change has taken place. Before the war, transport was under private control; to-day it has been re-organised as one body geared to the war machine. The pre-arranged plan for railways came into operation two days before war was

declared. The four main line railway companies and the London Passenger Transport Board, with a number of other companies, were placed under the control of the Minister of Transport, who appointed as his agents the Railway Executive Committee.

Similarly, on the day war broke out the necessary steps were taken to bring into action the Emergency Road Transport Organisation. This scheme based on the area organisation of the Ministry of Transport for the licensing and control of commercial road vehicles had been planned during the days of peace with the help of the Road Transport (Defence) Advisory Committee, consisting of leading men in the road transport industry with representatives of the railways and of the workers.

On the roads the problem was more complex: there is (as we shall see) little organisation among the road hauliers. Road transport is not in the hands of a few big companies; the 150,000 heavy lorries in the country are worked by 60,000 independent operators. Road transport had to be organised so that petrol was saved and so that lorries and passenger vehicles too were used for national purposes. The neglected canals had to be drawn in to help. At the ports, the job was to do away with variety of controls and get the ships turned quickly round, to speed the goods out of the port and to disperse them rapidly to the factories and the warehouses.

The brain and nerve centre of transport control

This was the first enormous phase in the strategy of transport and the plans laid before the war stood up to the test well. Each industry had got itself on to an efficient basis to meet the new conditions; good use was being made of railway trucks, roads, canals and ports and the many and varied demands of the war were faithfully discharged.

In the latter part of 1941, however, the changed conditions and the increasing tempo of war-production called for further action.

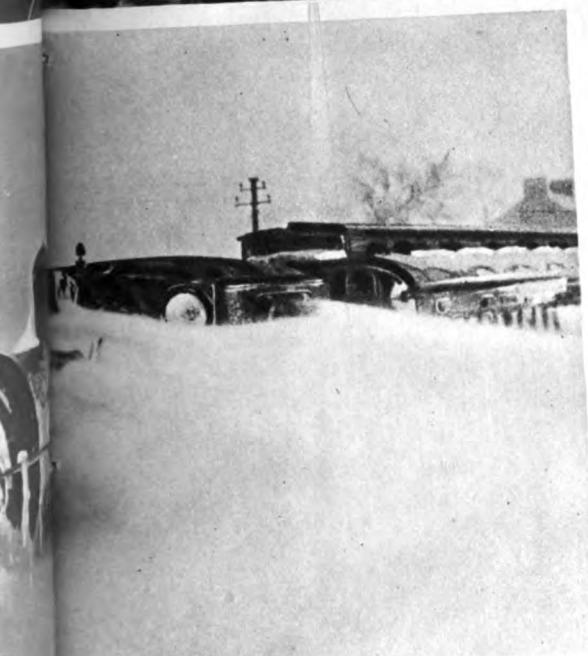


GOOD BYE
ANSPORT

HITLER



THE CHILDREN LEAVE THE CITIES . . . AN ARMY ON THE MOVE . . . THE



OVER . . . GREATEST FREEZE FOR FORTY YEARS . . . THE RETURN FROM DUNKIRK

In August, 1941, a new railway agreement was made and Sir Alan Anderson became Controller of Railways and Chairman of the Railway Executive Committee with Sir James Milne, of the Great Western, as Deputy Chairman.

This Committee with its teams of technical experts is in almost constant session. It issues directions for the Minister and places before him the views of the railway managements. It is, in fact, the brain and nerve centre of an elaborate system of control. Working directly under it is the Central Operating Conference, a body which never meets in the ordinary sense, but confers every morning of the week, Sundays included, by telephone. These telephonic sessions last barely half-an-hour—never more—but in that time the conference works fast. Every morning produces a fresh crop of problems. They may concern some traffic diversion, a local shortage of locomotives, a big traffic movement. Whatever it is, the question is examined in its broadest aspects and the decision is crisp and final. Under the R.E.C., also, is the Central Wagon Control. Through this organisation, as we shall see later, the railway chiefs are in a posi-

tion to ascertain each day the numbers of wagons available.

On the roads, the Government decided that there must be a fleet of vehicles under Government control and that much, if not all, of the long distance movement of Government traffic by road must be arranged through one channel. To meet this situation the Ministry of War Transport—as it had now become—with the collaboration of the Road Haulage (Operations) Advisory Committee under Major Renwick worked out the Road Haulage Scheme. This scheme consisted of three parts—a fleet of chartered vehicles under the Ministry; the Hauliers' National Traffic Pool managed by a committee of operators; and the Defence Lines consisting of vehicles for emergencies. Although to-day road transport is not working to anything like capacity, owing to the need for saving rubber and petrol, it remains as the essential reserve of the whole transport system.

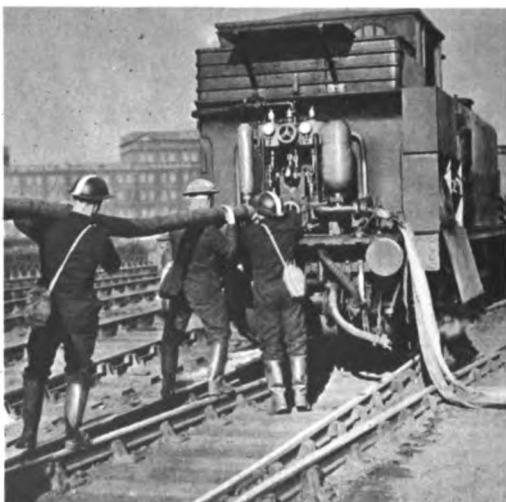
On the canals, the six regional committees were strengthened, and a central co-ordinating committee was appointed under the Joint Parliamentary Secretary to the Ministry.

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TRANSPORT PREPARES



The names go



Fire-fighting train



These steps were followed in June, 1942, by the announcement that the Ministry had decided to bring the principal canals and canal carriers under a scheme of control similar to that exercised over the railways.

The aim of the second strategic phase was to co-ordinate and develop, to spread the burden and to keep pace with production. For this purpose two committees of experts were appointed—the Inland Transport War Council to advise on policy and the Central Transport Committee to co-ordinate the demands of Government Departments and plan large-scale movements. These committees are faced with three decisive facts: that transport is working under a greater strain than ever before; that it cannot grow because new locomotives and new lorries cannot be made except at the expense of munitions; that hundreds of new factories are in full production. The job increases; the tools do not increase.

The task of the strategy of transport in Great Britain therefore is to see that the trains, the lorries and the canal boats, are used for essential purposes only. Cross hauls have to be cut out, as much as possible; even the long

hauls must be cut when alternative goods can be found nearer to the sources of supply. There must be quicker turn round of vehicles, as there is of ships at the ports. These are the questions which are argued out every fortnight when the Central Transport Committee meets and officials and the trade get together to-day.

The Central Transport Committee is the Joint General Staff of those responsible for the direction and use of transport. Each meeting is a council of war at which big movements of war freight are planned. In effect this joint planning by experts and officials means that all branches of the transport industry are now working as a nationally centralised service. The old rivalries are dead, or at any rate dormant. In place of a mass of unrelated undertakings, each competing with the other, there is one system in which every wagon, lorry and boat has its part to play.

Such are the lines upon which inland transport has been organised for war, and the strategy its commanders have developed. To test the growing organisation—a test severe both for the headquarters staff and the front-line workers—came the blitz. . . .



loodgates on the Tube



Signal lights hooded



A.R.P. gongs

The Busmen

k ne

abo

CHAPTER THREE

THE bus men, the tram men, know all about the blitz. And the women too. In London the women had just started on the conductor's platform when the blitz began. In those early days they were a good deal conscious that they were taking the place of a conductor who had perhaps worked with his driver for 12 years, who knew the things that got his goat and the precise meaning of that ironical expression which comes on to a driver's face when he looks back through the window. They were taking the places of men who knew London like the backs of their hands. It was hard luck on the waitresses, saleswomen, mannequins, maids, ships' stewardesses—there are even said to be ballet-dancers too—that the blitz came and mixed up the bus routes of London like string, to mention nothing else.

The blitz crammed London's rush hour into one hour, instead of two and a half. The buses went on running. When the bombing became bad they drew up to the nearest shelter, but there are tales like the one of the driver who drove on to Paddington to get a sailor on to his last train; or of the trolley-bus driver who, during a raid, saw an H.E. strike

a house, stopped his bus and went in and rescued seven people. And having done so, continued his journey. The driver sits behind Triplex, but acres of glass must have been blown out of the windows of English buses during the raids. The bombs, the glass flying through the air, the debris on the road, and the craters—most of all the craters—were the busman's dreads. There were fantastic escapes. At Balham, a bus entirely disap-

the Blitz



peared over what was more like a cliff or a quarry than a crater, dived in head first. The conductor had jumped, the driver was got out unhurt.

Before this record is finished there will be many stories to tell of courage, enterprise and indifference to danger. It is by accident that one is able to tell them—the accident that somebody happened to be there and saw this man or that do the courageous deed. For

you would hear nothing from the man himself, unless it was necessary in the course of his work to speak of it. To the outsider who saw it or hears of it, the act is dramatic and heroic; to the man at the time it was perhaps exciting, frightening and even put him in a temper, but there was no more than that to it. Transport men are just as much members of the public as anyone else. They do not feel any differently. Except, perhaps, in two ways. They

have a professional pride in the community's urgent need of them. They feel safer when they are in the open and on the move. "Warning's on. Better get cracking."

Among London's medallists who won their honours in the blitz, there is a tram driver, a thin, dark man of about forty, who wears the O.B.E. ribbon in his coat. "It so happens," he says, clearing the ground for his stories of the blitz, "I was bombed out three times myself, apart from what I met on the road." Which story will you have?

Let us look at the night of November the 1st. It was the third time he had been bombed out at home, but at four-thirty in the morning, as usual, he was on his way to work. Walking—there was no transport. The alert was still on but he was taking it calmly, walking towards Camberwell Garage and smoking a cigarette which he kept hidden in his hand "just in case". Presently, when he was very near the garage, he heard a plane flying low. He was passing a church gate at the time and he stubbed his cigarette on the stone. The next moment he was blown through the gate. When he picked himself up he saw a huge fan of sparks going up from the roof of the garage

over a hundred feet into the air. He made for the place at once.

At first there seemed to be no one there except an Inspector.

"Come on," said the Inspector. "I think we can do a spot of work here."

They went to the gate of the garage, but it was locked. So they went round to the second gate. This one was open. Some of the chaps had turned up and inside the garage they saw the buses standing in the light of the flames. Many of them were on fire, chiefly their upper decks and their back stairs, and there was an awful stench of burning upholstery and paint.

"Come on, boys," the Inspector shouted. "It's your living that's burning."

The tram driver ran to the nearest bus—London Transport had had the foresight to train a number of tram drivers to drive buses, before the war—and he was half-way into the cab when the sort of thing happened which always happens when, to put it mildly, you are in a hurry.

"Not that one. The front wheel's off," someone shouted. So it was.

So he went on to the next bus. There were

THE BLITZ HIT CITY TRANSPORT. A BOMB TORE THIS TRAM FROM ITS CHASSIS . . .



nine buses on fire altogether. He got into the cab and pressed the starter. She didn't budge. The engine was cold.

"Go on, cock, let her have it!"

No response. The flames were burning busily behind. He sat there pressing on the starter and watching the roof of the garage, which was burning. There was a girder over the exit, which was beginning to bend. This bus and all the buses would have to pass under the girder. And then, as they say, "she had it." The engine started up and he took her to the exit. But it was barred by the hoses of the fire brigade and by their engines. The London Fire Brigade do not like people to drive over their hoses. A policeman came up and said the buses could not come out. They would have to stay in the exit—under the girder.

You always come against this last minute complication in all the rescue stories of the blitz. The tram driver considered the situation, which means that he considered the policeman. He came to the conclusion that a bus is heavier than a policeman. So he trod on it. They got all those buses out.

The casualty figures alone tell how the blitz

hit the London tram men and bus men. One hundred and forty-one were killed, 406 were injured—not in their homes or in shelters but while on duty. London was divided into areas, and each area organised itself during and after the raids according to the local conditions. There would be a controller at a strategic point, say Bishopsgate, and he was on the phone half the night getting his mes-

AT BALHAM A BUS DIVED INTO A CRATER . . .





... BLAST BLEW THIS BUS UP THE SIDE OF A HOUSE . . .

sages from the Road Inspectors who told him what routes were affected. By four or five in the morning they had a picture of what lines would have to be re-routed. The Road Inspectors had a terrific job, especially on nights like the 29th December, 1940, the night of the fire of London. People had to turn out of the shelters in the City on that night. Down at Moorgate where the fire was hottest an old Inspector was found reporting that eight buses were in danger of burning and that drivers could not be found. (The drivers had been sheltering but had no doubt been driven out by the fires burning above them.)

"Guv'nor," said an old man to the control-

ler, "there's been nothing like this since 1666." He knew his history. Road Inspectors drove those buses to safety in the end. But one of the most remarkable jobs of the blitz was the shuttle service of two buses which used to run between Moorgate and London Bridge whenever there was an Alert. What the drivers dreaded in this service was the journey over London Bridge, which was not only dangerous in itself but was exposed to everything coming down out of heaven. Women conductors were employed on this route as on many others. It was an arduous beginning. While they were out on the job these transport workers had to face a good



BUT TRANSPORT STAYED ON THE JOB

many horrible sights. The breakdown gangs came out from Dalston and elsewhere to deal with unexploded bombs—and one gang was wiped out as it was pulling a bomb out of a crater. The drivers often saw the bodies of their comrades lying in the street, as at Bishopsgate, or, as at the Bank, had to help clear up the awful human shambles. Many of these men have faced horror which far outdid anything they had seen in France during the last war.

It would be as easy to sink the Island of Malta as to smash the English road system. You may have chuckled with G. K. Chesterton at the drunken rolling of some of our

older roads; and you may have got hot under the collar at the congestion on some narrow sections. But after that is said, the English roads as a whole were in better condition and had better surfaces before the war than any roads in Europe. They have stood up to the wear and tear of three years of war remarkably well, and if the English road system is something of a maze, it is, unlike the French system for example, a paradise of alternative routes.

Not that engineers feel any complacency on that score. When the layman looks into a bomb crater in the road, he assumes that all you have got to do is to fill it with rubble and put the steam roller over it; but engineers in the big cities always point out that a wound in a road is not a surface wound, but like a deep wound in a limb. Bones have to be set, veins and arteries tied up. Underneath the road are the telegraph lines, the water mains, the gas mains, the electric mains and the sewers. A delicate piece of field surgery has to be done on the spot, and at once. Some craters—the one outside the Bank of England, for example—have had to be bridged by temporary bridges.

And the engineers have not only had to deal with the work of man. Nature is often a nuisance. Subsoils vary from city to city. In London there is that maze of underground rivers, waters like the Fleet and King's Scholars Pond river, which, pure as they are, are ignobly known as sewers; and those waters are hard to turn off at the main. The engineers who were dealing with the Fleet after one of London's "incidents" had a bitter laugh when an earnest warden, seeing the Cockney Niagara in full overflow, cried, "Why hasn't someone turned off that water?" That is the lighter side of a struggle in which ingenuity always defeated ruin. The engineer, like the surgeon, has a professional love of the "pretty operation".

A bus dives into a crater and perhaps disappears from sight; it has got to be hauled out. In Liverpool and London, and elsewhere too, the tram and trolley-bus cables came down,



STREETS WERE CLEARED . . .

"VEINS AND ARTERIES TIED UP" . . .



OVERHEAD CABLES REPAIRED . . .

GAPING CRATERS FILLED

sometimes the standards which supported them. During the autumn months of 1940, the engineers of London Transport, working on the roads, used 20 miles of overhead wire and 8 miles of cable for feeding the trams and tubes. They ran their bays of wire, 40 yards to a bay, over the trees in people's front gardens when the standards had gone; in other places, notably in the Commercial Road, they found a new route, planted 43 poles for half a mile—and poles go in 6 feet beneath the pavement. It is not as easy to work out a diversion as you might think—width of street, corners for turning, have to be considered and many promising routes have had to be abandoned because there was not an extra couple of feet to spare at the top of the street. The engineers were proud of this effort in the Commercial Road, which might not seem much to the layman, and there was a touch of swank in the way they painted the white rings on the posts, as required by the road regulations.

**They worked all night to the
tune of the shrapnel**

Of course they'd planned for this sort of thing before the war. At their headquarters in a disused tube station, the message came in one Saturday night that a bomb had dropped at Southgate, destroyed a bus and blown down 12 bays of overhead wire. The flying squads, which are always out and ready during the raids, came out with their travelling towers and got to work at once. They worked all night to the tune of the shrapnel coming down on the roofs, and by five in the morning the first bus passed through as usual. The incident could be matched in many an English city. And it is not, by the way, merely a question of getting the wires up. The current, "the juice", has got to run through them; and if the normal source is damaged at a sub-station under the pavement—which has often happened—then the Heath Robinson instinct (in more official phrase, the instinct of improvisation) awakens in the engineers,

and they get tram "juice" from the railway, or railway "juice" from the trams.

Those are incidents of the street scene in wartime. A good deal more could be said about the art of filling in holes. But turn to the vehicles for whom the engineers and their gangs have been working. In September, 1939 there were 50,000 buses and coaches and pretty well half a million motor lorries and vans using the streets. That is an easy way of putting it. But they belonged to numbers of owners—to anyone from the local butcher to a City Corporation. London Transport had 6,400 buses and coaches and a staff of 86,000. Those are probably the largest figures, but the figures for Manchester, Glasgow, Birmingham, are also enormous.

On the 1st, 2nd and 3rd of September, in the famous three days of evacuation which so many people regretted, 607,000 people were got out of London on that planned migration by London Transport alone. You saw the buses and coaches parked at the schools, the stations, in the country squares, giving that misleading gay impression which a bus always gives when it is off its route and has *Private* on its direction board. Then in August, 1940, when the Battle of Britain began and everyone was telephoning to their relatives, the second book of Exodus was started. Not such a fat book; but 127,000 people were moved out of London alone. In Bootle, the town of dockers which was badly raided, the buses got a large number of people out at a few hours' notice. The telephones had gone, so instructions were sent out by lorry. The order to evacuate did not come till four in the afternoon; but everything was ready to start by seven o'clock, and by eleven o'clock that night the people had been taken away. They were mainly dockers who had to be back on the job in the morning, and those services, also, had to be organised.

One could multiply examples of this kind of thing, from Birmingham, Sheffield, Coventry, all the raided cities. Drivers worked without sleep and on scanty food. This is the kind of

"speed up" which causes no feeling between owner and employee, and it brings out the great virtue of the men on the roads, which the life of the road has built up in years of work: their instinct to help. This is not a pious statement. The war has brought out that instinct everywhere, but the road drivers of England have always had it; it is an occupational virtue springing from the nature of the job and its life. They hate interference; regulations make them irritable. They have a natural independence and are always in tacit civil war with minor authority—the police, the inspectors, and so on—they have a fierce down on lickspittles and, for example, on what the London drivers call "the right-on merchants"—the men who hang on to your stairs and watch you pick up the passengers.

But among them, more than in any other calling, the man who does not help is damned. It's a legacy from the ancient morality of travel, handed down to the penny fare.

We are used to moving when we want to; almost any plan or wish in our civilised heads means getting into some sort of vehicle; we would think the end of the world had come if we could not do so. Well—transport which takes our money, knows its job; it ran its services during raids and actually produced vehicles to get tens of thousands out of the cities, often while raiding was on. Fleets of single-decker express coaches were specially prepared so that they could be quickly converted into ambulances—and it must be remembered that, in the first evacuation, hospital patients were moved in hundreds.



Out on the



Roads

CHAPTER FOUR

LET us turn from the men who carry the people to the men who are carrying the goods. The battleground changes now from the streets to the roads, the warehouses, the loading bays of the hauliers and the "caffs" of the main trunk highways. The picture is very different from that of the passenger services or the railway services, with their private and municipal combines, and their long established habit of handling large blocks of goods and human beings. To start with, there are 60,000 hauliers in England, from little men with one or two vans, to big men with two or three hundred. Between them they run 150,000 vehicles.

They range from the petrol fleets, the milk fleets, the meat hauliers, to the men who work the trunk services, to the market men and men who work for hire and are only a decade away from the fighting conditions depicted in *The Road to Frisco*. The owner, sleeping at night with his telephone beside him, woken by a long distance call about a breakdown or a change of route, getting up in the small hours to look out of the window at the weather, and to seize his chances at the market, was and is a typical figure. After the last war a large

number of men came out of the army and invested their gratuity in a lorry and built up their own businesses, pretty well on the *Frisco* lines. They are an independent crowd of men. It is a "tough" business. There is sometimes rough stuff in the office, arguments on the stairs, every one Tom, Dick or Harry to everyone else, and the telephone always ringing. What do they carry? The books are very secret. Everything from elephants to bees, is the boast.

It is more sedate in the big companies. They live on the large contracts. Bringing the yeast from Bristol overnight for London's bread, carrying the cocoa beans to the manufacturers, twelve tons at a time on the eight wheeler trucks. The long distance drivers with their house badges on their caps come in, punch their tickets, check their time, exchange blasphemies with the foreman, complain about the front tyres or the springs, and hand over to the shunter-driver who does the local driving. With the smaller companies the process is much the same, except that the driver had probably loaded his own van and will unload it when he arrives. He has no shunter.

The business of such a varied industry, which works in so closely to the skin of English life, is an intricate one, intimately related to all the moods and habits of local life as well as to the main demands of the cities. But gradually, since the war, the hauliers have





THEY DROVE THROUGH THE BLACK-OUT, AND KEPT TO THEIR SCHEDULE . . .

been mobilised for special jobs for which their speeds and flexibility suited them. The distribution of Anderson shelters all over England was something which road and rail handled between them. When meat rationing came in, the hauliers organised, and handled the meat and the livestock from the markets to the slaughter houses.

One of the curious big jobs of the industry was one of those fantastic things which tended to happen after the fall of France. A hundred thousand sheep were grazing on Romney Marsh under the eyes of the enemy, a valuable booty and a dreadful nuisance. In invasion they would have been like refugees on the road. They had to be moved *en masse* by road and rail; for 19 days, a thousand lorry loads of sheep were taken off and distributed over England, in double-decker trucks, the lambs on the top storey and the ewes beneath. There were only six casualties. (The carrying industry on road and rail, is especially

expert and tender in dealing with animals. In the rail sidings you hear a warning shout to shunt gently when a cow truck comes down the line to the shunters, and there is always a man on hand who will milk the cows on their journeys. Many calves have been born safely in a truck in a marshalling yard or local siding.)

Another great job of dispersal which the hauliers did was the removal of timber from the exposed timber yards and wharves of Hull in May, 1941. In war time this sort of order is telephoned to the Regional Transport Commissioner and has to be obeyed as quickly as a military command. That order came through on May 9th. By May 10th, a Saturday—and these urgent orders have a way of coming at the week-end and causing a lot of "language"—four hundred lorries were working on the timber. The canal barges swarmed up to the wharves and, once the railways were in action again to-



THEY DROVE THROUGH THE BLITZ—AND WERE NOT ALWAYS LUCKY

wards the end of the week, nearly 43,000 tons of pitwood, sawn wood, plywood and logs were out of the danger zone. In peace time—despite all the advantages of peace—a job like this would have taken six weeks. War has driven the ports and the transport working with them to simplify and concentrate their organisation. That old amiable bugbear “the custom of the port” has had to be adapted, altered or bluntly shelved in the interests of the nation.

They drove out of the Mersey blitz, through the Coventry blitz, into the London blitz. At some outlying “caff” they would exchange gossip about who or what was “copping it” and then, with a “To hell with this”, they went out to their cabs, pressed the starter and were rumbling off. They were proud of sticking to their time. They had, as most of us have, a strong belief in their own luck, and they felt “sorta safe” as long as they were moving. They will point out an oldish man in Bristol

who “moved” to some effect in this way. He had “the feeling” that he’d move his truck from a warehouse corner a hundred yards up the street; half a minute later an H.E. hit the corner. “Cor, look at the ol’ b. . . . You ought to be blank well dead.” It is a kind of fame.

On Coventry’s evil night, the police stopped the convoys outside the city and led them an infuriating 80-mile diversion down country lanes—the sort of diversion which breaks your heart on a long run. But they went on to London and were not very late with London’s butter and bacon. Indeed, one fellow, watching his chance, gave the “toadstools” the slip (Toadstool = what crops up suddenly in the night = policeman) and drove through Coventry as it burned. The luck did not always work, of course. You pick up the provincial papers and on the back page you see the item: Presumed Death of Lorry Driver—Last Seen entering So and So Dock on the night of May

5th. Many lorry drivers were "last seen" like this, on the job; and someone finds a lorry wheel or half a radiator in their garden a quarter of a mile away.

The lorry drivers do not talk very much about these things and certainly not to strangers. They rather resent the idea of their profession being known by its melodramatic and exceptional moments. A moment is only a moment, but the job goes on year in year out, building up its daily momentous account of hard work, and the virtue of the profession. They would much sooner tell the sardonic story of the driver who was given five new unexploded German bombs to take to London for examination by the experts, and was obliged to accept a military escort who preceded him on a motor bicycle.

Now, giving a lorry driver an escort is rather like telling the driver of the Coronation Scot that he has got to follow a man walking down the line with a flag; and this little procession on the Great North Road did not start off in the utmost harmony. There was a growing determination in the lorry driver's mind to lose that escort; but happily, as it turned out, the escort lost his way and the driver simply pitched the motor bicycle into the lorry with the bombs, took the soldier in the cab, and got on with the job. Lorry drivers haven't had nearly three years' driving all over England in the black-out, without sign-posts, for nothing. The fact that one of those bombs turned out to be "live" on arrival, is not part of the story as the lorry driver sees it. These men are a good deal more vocal about the snow and ice on the Pennines or in Durham or the Marlborough Downs in the first winter of the war than they are about the blitz. And they are, in their terse, poker-faced way, proud of getting through.

Let us look at the Great West Road at night. The London to Bristol run is not as heavy as the northern run at night. The lorries fan out of Bristol as they do from the Mersey. London's yeast is one of the things

that come up from Bristol every night of the year.

A night driver of ten or fifteen years' standing has eyes which are different from yours or mine. He knows, to start with, where all the police are; he knows, from where they are, what they are up to. It is a game like schoolboys and schoolmasters. The wise policeman is like the wise schoolmaster; he is sometimes blind. Then he gets on well with the drivers. They'll drink a cup of tea with him at four in the morning in some yard, and both sides will say they know enough to hang each other. Wit is the *sine qua non* of the road.

Then, as you leave London for the west and the black-out comes, you see the road signals, the flashed headlights which are the



language of the road. A flash to the lorry in front: "I am passing you". You pass. A flash from behind, to say, "All right, room to pull in". You pull in and flash back, "Thank you". Flash again when lorries of the same line pass in their opposite journeys.

They know every lorry on the road. The cat's-eye lights approach—if you can call war-time lighting "light" at all—of a convoy going eastward. Those are the ambulances working up to their station outside London to wait for the warning to go. Every night they move up. "There's Tiny", the driver says. You look. You see nothing. Then very faintly and as if miles away you can see a small prick of red light. Your driver knows by the position and size of that tail light exactly what lorry that is and who is on it.

They are cat's-eyed men. Shapes and sounds and pin-points of light which are meaningless to the stranger are eloquent to them. "What's the time?" you ask. "Two minutes to one", or "just gone ten past three", they reply. Check it on the clock and they are right to half a minute. And when they stop at a "caff", in the sudden silence of the road you hear a ticking sound behind your head. There's a clock there which records exactly how long they've run and how long they've stopped.

At any "caff" on the road the same men reappear. The stories they began at the first place are developed at the second, completed at a third; it is like being present at a play. There are the same characters with different lines. This tip-and-run companionship, with

THERE'S A SORT OF TIP-AND-RUN COMPANIONSHIP OUT ON THE ROADS



its meetings and partings, its news, its secrets, its accusations, its protests and leg-pulling humour, is the reason of the hold the job has on the drivers. Being alone on the job, they love this talk and chaff; being insignificant, alone and silent at the wheel for hours, they bawl like old-fashioned actors at each other.

Skim off the obscene adjectives which are introduced before every word of their talk, discount the violent gestures and remember that, if two men are bawling an inch from each other's faces, they are not having a row but are engaged in the leg-pulling and showmanship dear to the profession, and you find shrewd, hard-headed judges of men and the world. They are straight, decent, blunt and absolutely loyal to their code. They feel themselves to be a kind of brotherhood pledged to help each other; pledged also to knock hell out of anyone who breaks the rules and lets them down.

In the main street of Bath at four o'clock every morning of the year you will see a middle-aged woman signal to the lorries. They pick her up, take her across the town and stop at a sort of cupboard in the wall near the railway. There she gets down and everyone gets down. She goes into the cupboard and makes tea. About five men can sit in that place with their knees touching. At four o'clock she is always there, as precise to the minute as the lorry drivers themselves, a sort of national landmark to them.

At six they will be in Bristol, looking for thick bacon at the lodging house. There they sit, shouting at each other the names of the journeys—"Aldershot and Newmarket, Birmingham and London, Sheffield and Newcastle"—and their loads: steel, meat, transformers, food, yeast, cocoa. The door is continually opening and shutting, drivers are coming downstairs, getting up from the table to make room for others. The faces change every quarter of an hour.

Looking at what is left of the centre of Bristol, you ask what it was like seeing the glare in the sky outside the city and wonder-

ing whether you could drive in. This sight was seen by a couple of drivers who had come down from Leicestershire to collect barrels of fat which were to be taken back to the Midlands. They seem to have decided that fat was the last thing which ought to be in Bristol that night. They also had a pride in their job; and, when work is the most serious thing in your life, you do not easily allow anyone to make nonsense of it. So they drove into Bristol.

Rubble was in the streets, wire was down everywhere; there a crater, here a fallen wall forced a detour. The only good thing was that fire did away with the black-out. They arrived at the warehouse, and there the light was perfect; the place and the barrels of fat in it were on fire. Well, you do not drive all night across the Midlands to be made a fool of when you arrive. These two men took a careful look round, found out that there was one part of the warehouse towards which the flames were creeping but had not reached. That was good enough. No one being about to help them, they got out and rolled as many barrels as they could on to the lorry and drove back with them.

One picks out a story like this from many. Many a driver has had to lie under his lorry. Many have had to fight fires at the garages after a day's work. There were the men who drove petrol out of Barking, the men who have driven loads of shells in the "thunder and lightning". At Paisley, the drivers got together one week-end and worked voluntarily at saving the furniture of the bombed-out workers on the Clyde. They would not claim any exceptional merit for these actions, for this has been a civilian's war. But the men on the roads and railways are out on the job, away from their homes, knowing well that their own families are catching it. It took a stoical determination, an imaginative sense of the importance of the job they were doing, to make those men leave their families for the job. After all, they could have "gone sick", had a "breakdown", or simply stuck in the Anderson at home. But they did not.

The Waterways come in



CHAPTER FIVE

THE canals are the poor relation of the railways and the roads—a member of the transport family fallen on evil days, who nevertheless appears to scratch some sort of living together in a mysterious way. At any rate that was the position before 1939; since then the family has seen that it is important to get this decaying character back into the fold and to do something for its reformation. It was a question first of all of cutting losses. There are empty canals, disused canals, canals silted up and choked by weeds, canals whose banks and tunnels have fallen in and which have reverted to nature.

Their time of prosperity was between the middle of the 18th century and the building of the first railways—the first navigable canal, the Sankey brook near Manchester, was started in 1755—and only a few of these waterways were able to stand the railways' competition. These few were not always the long ones; occasionally the short ones in the Black Country, or even a mile or two of some longer canal otherwise idle, have been paying propositions. Briefly, it may be said, that when the situation was surveyed in 1941, the Ministry of War Transport was advised that about 500 miles of canal would have to be written off as irredeemable; and that all war efforts must be concentrated on the very substantial 2,000 miles of navigable water which remain.

If you look at the map of the canals in the British Isles, you will see that—apart from the three canals in Scotland—the system falls into four parts. These correspond to the four great estuaries: the Thames, the Humber, the Mersey and the Severn. The canals work inland from these starting places, relieving and feeding the docks and, after long unbroken runs, break into small branches in the Midlands and in Lancashire and Yorkshire. The first thing to remember about them is

that they should be compared with the roads rather than the railways; for where a railway owns the track and sidings, and operates the vehicles that run there, the waterways are owned by the canal companies, and with three exceptions, these companies do not supply the craft which float on them.

The companies exist, in theory, by the tolls they collect from the barge and boat owners; in practice, these tolls are but a portion of their income. That income comes from a number of other sources, e.g. from warehousing, property, investments, etc. A large number of factories are built beside the canals, and one form of canal revenue is the sale of water to the factories for condensing purposes. The companies who own the craft are numerous and very different from each other. A gas company, firms of millers, quarry



owners, brick makers, etc., may own fleets of boats. Or there may be companies which live by carrying. In some areas, in the Warwickshire mining district, for example, there are many "little men" with family-owned boats, who work the short-distance runs from the mines to the Midland factories.

An important distinction must be made between a barge and a boat. A barge is a vessel of some fourteen foot beam which normally works in flowing water. Many miles of static, inland waters are too narrow for them. The barge which operates in living, tidal water, which goes out on to the estuaries, often picking up goods straight from the ships, is a vessel which requires a special skill in navigation; and this barge can carry large loads. What most of us call barges are not barges at all, but boats; narrow vessels of

some seven foot beam which often work in pairs and carry some 25 to 30 tons each.

One sees both kinds passing through the famous Paddington basin in London and going towards the Edgware Road tunnel; and it is the barge which is usually being drawn by a horse on the towpath. When they get to the tunnel the barge may have to be poled through. But comparatively few horses are used nowadays. The boat with its phutting engine is the commoner sight; and although there are no tides to reckon with, one will notice how even in stretches which seem dead straight and without complication, the men will go to their tillers and pull the procession over to one side as they approach the locks. There is an art in keeping that line of boats straight as it enters the narrow gates, an art which saves it from buckling, swinging broad-

THE CANALS CARRY OVER 12,000,000 TONS OF ESSENTIAL GOODS A YEAR





MUNITIONS BY WATER: IN THE GREAT ESTUARIES BARGES FEED AND

ELIEVE



side on across the water and blocking the channel, or suddenly bending and colliding with a procession passing in the opposite direction.

Although the capacity of the canals is severely limited, they still carry twelve million tons of cargo every year. What is the cargo? Half of it is coal, coke and other fuel. In Birmingham they will carry 100,000 tons of coal a month; on the Leeds and Liverpool canal, 80,000 tons a month. The railways who own canals carry nearly 30,000 tons of coal a month by water. Four hundred and fifty thousand tons of coal are carried every month by the boats and the barges. The other cargoes are, of course, the simple bulk cargoes, like tar and oil—tar is important—granite, gravel, grain and many other food-stuffs for home consumption, steel and cement for our industries, and every month over 400,000 tons of these are carried from the ports and the depots to the storage places and the factories. The important relief which the canals give to the enormous war-time pressure on the railways is obvious.

This was seen when war broke out and an elaborate report on the canal system was made. Many serious difficulties would have to be overcome before the canals could play their part to the full. First of all, in order to get some control of the flow of traffic and the use of boats, the country was divided into six areas under Regional Committees. It was the same sort of plan which had been applied at the ports. But even more important than organising the movement and reserves of barges—as the railway wagons and lorries have been organised into pools—was the question of labour.

In a generation, the population of boatmen has become very small. Think of the life on the boats. The hours are long—a 12-hour day is inevitable—the men may frequently have to load and unload their own boats at wharves without cranes, for which they receive extra pay. To hump 50 tons of coal on to the wharf after a 12-hour day is not an



SKIPPER AND DECK-HAND. Men who sail an estuary barge must be skilled in navigating tidal waters.

attractive prospect. Living conditions are primitive. Wages are on the low side. It is true that during these long hours a man may not be working hard; he may merely be standing at the tiller. But the life is lonely; the industry had been largely recruited from those born and bred on the boats; and the younger generation saw that if they wanted the amenities, the higher wages, the entertainments of modern life, and better opportunities for education for themselves and their children, the best thing they could do was to leave the water.

The earnings on a pair of boats average £7 a week. This looks well, if the whole of that £7 a week is going into one family; but not all boats by any means are one-family boats. Usually each pair of boats has a captain, a mate and a boy, which means when the money is divided up that the captain gets

£3.10.0 per week, the mate £2.10.0 and the boy £1.

The labour problem is a hard nut to crack. There has been an ingenious suggestion that women should take up the boatman's trade—a woman standing at the tiller with her baby in her arms is of course one of the picturesque sights of the canals—and two ladies have indeed made a success of carrying grain from the Severn to Worcester, doing regular trips. They don't do all the loading and unloading, of course, but they work the locks themselves, which is pretty hard work. There is a plan to train women for this canal work which these two ladies began as amateurs and turned into their trade.

The war has been hard on all transport workers in the matter of food. And the boatman has had very similar difficulties to those of the railwaymen and lorry drivers; rather

more serious difficulties, for the drivers on road and rail have had only themselves to feed; but the boatmen have frequently to provide for their families. It is one thing to lean over the canal bridge in some pretty and out-of-the-way country town, listening to the tap of the boat engines as the boats arrive in the evenings; quite another to come into that place hungry, with traveller's food cards, and to be told by the shopkeepers that they can supply their registered customers only. The remedy, as on the roads and the railway hostels, was the canteen and many of these have now been established.

Like the other systems, the canals have been greatly affected by the turnover of traffic from the east coast to the west, since the fall of France; and this reversal of the flow has been one of the chief jobs of the Regional Committees. The canals have not had to "take" the blitz, as the railways took it; they have

suffered far less even than the roads. But there have been "incidents". A bomb will topple a building into the water in the city, or burst a bank and cause flooding; but there has been nothing to compare with the nightly struggle of the streets and junctions. What the war has done for the canals is to arrest their decline; and to give the Government and the industry a stimulus to reorganise them from top to bottom. When one sees these people on the boats, the water gypsies who from generation to generation have built up a curious, tenacious life of their own, one realises they too are part of transport's battle. As they chug along on their eight-day journey from London to the Mersey, or their fortnight's round voyage to Birmingham and the collieries of the Black Country, the battle has indeed overtaken them. That trade, which looks so leisurely, is taking on its share of the back-breaking jobs of the war.

WOMEN TAKE OVER. Two run this boat alone, carrying grain on Midland canals.



The Railwayman's

CHAPTER SIX

Six hundred thousand men—and women too, nowadays—work on the British railways. There are 20,000 route miles of track. The railways, as the largest partner in modern transport, have to carry the heaviest tonnage of the war. The railways took the brunt of the great migrations from the cities in September, 1939 and during the air raids; the railways took most of the troops who landed from Dunkirk, and faced heavy punishment from the blitz. But these were only the dramatic moments; their main and growing daily war-work is the carrying of troops and munitions, keeping pace with the ever-growing deliveries of the convoys and the war-output of the factories. All this in addition to their normal work of maintaining regular services everywhere for passengers and freight, and carrying mails, parcels, newspapers and the thousand and one items necessary to the nation's daily life.

The huge war-effort of the railways has had to be made, as we have already seen, without the help of new rolling stock; indeed there



have been sacrifices. By the end of 1941 engines and wagons were being sent to Persia, to hurry supplies to Russia. We had to leave some in France, earlier. Ninety thousand railwaymen have joined the Forces. The passenger gets his small private inkling of what is happening when he looks at the stacks of packages piling up at the Parcels Offices; the rows of bicycles getting in everyone's way since the petrol cuts; the train held up at the junction for a platoon of soldiers; the twenty goods wagons at the country station, filled with sections of army huts, straw that used to go by road, felled trees and scrap, where before the war there were just a couple of coal



wagons awaiting the dilatory bags and shovel of the village coal merchant.

Turning from the hints you get as you wait on the local platform to the vaster war-time picture, you see in the coal traffic, for example, the kind of problem which has tested the strength and ingenuity of the railway companies. Much of the coal which used to come down from the north-east by sea before the war now comes by rail. But in that first winter of the war, the worst winter for forty years, 1,500 miles of track were blocked by snow and the points frozen immovably by ice. The householder was down to a sack of dust a week and the long-distance passenger

train service had to be cut in Northumberland and Durham in order to get the "coal specials" through. The "coal specials" were run at the rate of 27 a week, and since then the rate from the north and the midlands has gone up to 450 per week. That is a measure of the drive for more coal.

You stand in the warm, automatic signal box at a place like York and watch the lights on the chart change colour, section by section, as a train moves through the intricate junction. "Coal special", says the signal-man nodding to the window. A bell rings, a far light comes on at the end of the chart. "There's another". In the underground Control Rooms

the words "coal special", "coal special" go on monotonously, as the signal-boxes send in their times. "All that is coal", says the goods manager in his smoky Victorian office, as he points out the figures on the daily report of the traffic position.

Down on the permanent way, as you stand in the sweetish toffee-like stench blowing down in the cold wind from the sugar beet factory, the "coal specials" move by in what seems like a permanent procession. They fan out to the midlands, to the northern furnaces, to the docks for the coaling of ships. You see them coming up the main line as you stand above the scene in the control tower of a great marshalling yard further south, on all the lines from Crewe or Ashford to the Cardiff yards. Coal has given the railway companies something to think about in the first three years of the war. You will never get a railwayman to believe that coal is short.

"Flow" is the key-word on the railways to-day

A mass movement of traffic like this would not have been possible if the old system of the private ownership of wagons had been retained. That has gone—most railwaymen hope it has gone for good. There is a Central Wagon Control now, which regulates the flow of wagons as they are needed. "Flow" is a key-word on the railways. A wagon on the siding waiting to be unloaded is a dead wagon, a train held by the signals at some bottle-neck is a dead train. Since the fall of France and the turn-over to the western ports, and with the lessons of the blitz only too vivid in the minds of railwaymen, "flow" has meant everything.

Fortunately, the railway companies had largely re-equipped themselves before the war, and though they have not been able to increase their rolling stock and have had, indeed, to sacrifice some of it, they have been able to lengthen the mileage of track, which has meant chiefly the laying down of new loops and sidings and the enlarging and

improvement of exchange junctions. A good deal of this was done for the coal traffic, and two million pounds went on this alone.

But there have been, as well, the demands of the new factories, for which sidings are indispensable, and some tracks have been quadrupled and valuable alternative routes have been enlarged. Some of the idlest sections of the lines in peacetime are to-day bearing extraordinary loads of most vital war material. Those who know the plan of the railways as a detailed whole can put their fingers on place after place on the map where, by deflecting here, enlarging there, our pleasure-and-commerce railway system has been put into battle-dress.

One of the many things the English nation is not quite honest about is the famous business of "muddling through". If we really muddled all the time we should not get through. Things like the evacuation scheme were excellent pieces of pre-war planning. One million, three hundred thousand people were got out of London in the early days of the war, and 1,500 special trains—not one of them in our crowded Bradshaw, but all of them invented—carried those people away. We happened to be moving an army about also. We happened to be dealing, too, with the summer holiday traffic.

And more. We have come to think of this evacuation—in which everything on wheels in England joined—as the removal of men, women, children, hospital patients and lunatics only. But out with the people went the contents of museums, pictures from the art galleries, office furniture, school furniture, the files of businesses and the tin boxes of the Government departments. It was nothing to see rows of school desks standing in the loading bays of the goods yards, as if waiting for a class. And besides, all this there were small items like a couple of score of trains getting the food out of the Thames warehouses. And the carriage of the large rush-loads of cement, sand, brick and steel for the building of air-raid defences.

Most of us remember that by the first December of the war we were no longer sitting in total, silent darkness in the carriages, and that the largest cuts in the passenger services had been put back. (We are now about 25 % below pre-war.) That Christmas, the old Christmas specials ran as usual, 1,500 of them. The 45 mile an hour speed limit went, and though the record-breaking runs were not restored, there was a respectable start-to-stop 50 miles an hour in their place. The restaurant cars came back, having served among other things as evacuation offices; but some things went for the duration. A large number of the steamships. Many of those white-decked boats have become hospital ships or have put on the camouflage of minesweepers.

But for the refined and rather cuttingly clear accents of the lady station-announcers telling him to "See all blinds are drawn", the passenger of those days might have forgotten the war. The drivers, the guards, the shunters, the men in the signal-boxes outside, con-

tending with the black-out, would have disillusioned him. For the driver the black-out means that the landmarks have gone, for he does not drive only by the signals. He has to know what stations he has passed; he confirms his position by the lights of a town, by the electric signs, the lights of the outlying factory. The dimmed lighting of the war-time platform, with its dismal white line and uncertain ending, makes it harder for him to know when to lower his speed and when to stop. And he is shut into his cab now by the tarpaulin which smothers the once friendly glare of fire and smoke which the engine threw up in the sky.

The place to hear what guards and drivers think of the railwayman's life during the war and especially of the black-out is the drivers' hostel. These hostels are all over the country—you find them close to the sidings. A fine new set of porcelain baths and new plumbing may be going in—or it may not. If they are lucky they have central heating; if they're

COAL HAS GIVEN THE RAILWAYMEN SOMETHING TO THINK ABOUT





THE FLOW GOES ON: THE GREAT STATIONS ARE ALIVE WITH THE MOVEMENT OF WAR

luckier they have not, for the one thing that a railwayman admires and sees he gets is an enormous, banked-up fire. It's very different from the dying clinker of the general waiting room: they do themselves well. It is part of that solid Victorian tradition out of which the railways have grown. Whatever Dickens said about Coketown, they know there how to build a fire.

By nine in the evening only the late-comers or insomniacs are about. The rest, as you see by the call board in the doorway, are in bed with a request chalked up, "Call at 1.30 a.m. for train at 3.30": "Call at 11.30 for 1.30": "Call at 3.30 for 5.30". The few sit in their blue boiler suits. There is the serious grey-haired driver and beside him his young fireman. They sit like master and pupil, father and son, and eat the meal they have brought with them in their basket. It is tinned roll, tinned stew, some fish the wife waited two hours for in a queue that morning. To drink, there is tea.

"You want to know what driving an engine is like in the black-out? Well, excuse my language, it's a b. . . ."

Or,

"It don't worry me much. I drive by ear. I know where I am by the sound of the country, the different noises made by the

stations and the bridges. Every bridge between Crewe and London has a different sound."

You ask the fireman the same question, but the driver answers for him. "He knows when I swear at him." All these men have the seriousness of people working to the strict regulations of a traditional calling, with its own dignity and customs. Their characters are marked by the obedience to detail in which engineers of all kinds are brought up, by the solitariness of the life and by their grave sense of responsibility. The driver of a train is like the captain of a ship; he is more alone than the captain of a ship; he feels the same sort of responsibility for human life, the same respect for his machine, the same concern for his time-table—and the same desire to get home. That is where the war catches him out.

"If you want to know what a driver's life is like—ask the women. They'll let you have it." A sardonic roar from other voices goes up at this remark. One has the impression that what a railwayman's wife would have to say would fill a book, since the war. For there is a shortage of drivers and firemen and guards—there is a congestion of traffic. The man you are talking to is a goods driver, and he may be up to six hours late from Carlisle. That means he is forced to stay the night here; and if he



continues his journey tomorrow he will be two nights away from home, perhaps three, instead of one. Tomorrow, if his luck is out, he may hear the call for a volunteer to take another train on. So, though "the more you do, the more you have to do", you "carry on".

A large part of the ordinary railwayman's war effort is just this volunteering and carrying on, though he may just have come through a normal 10-, 12-, 14-hour stretch. Somehow, away from his home, arriving in some small place when shops and cafés are closed, he has to try and find food. Like the roadmen, the drivers and guards have had trouble about rations, though they are better off than they were. And at the end of these goods trains, held up for hours on a side line, sits the guard alone by his stove, trying to make a Wild West magazine last the journey and feeling, especially when the Alert goes, that he alone at the tail of that train is the special target for the bomber. If you have seen a burned-out guard's van on a siding you will understand the feeling.

All these men have been on during the blitz. A dispute exists between drivers and guards as to who hears the sinister grunt of the enemy plane more clearly. There is a driver who went into Plymouth under a bridal arch of

searchlights, and was very surprised to discover the fires of Plymouth on his left when they should have been on his right. He had been diverted to a line which was strange to him and had no pilot driver with him who knew the road. (That is one of the air-raid problems: the English railways are well provided with alternative routes—a good legacy of the competitive days—so that, if a line is bombed, detours are fairly simple to arrange;



THE BLACK-OUT FALLS, the workers carry on.

but drivers who know those routes have to be got out, and that is often difficult).

Whatever official plans exist for dealing with parachutists and the plane which pursues trains on the line, the drivers have many ingenious private ideas of their own. One fantasy which recurs is the picturesque one of "luring the bomber to the mouth of a tunnel". In fact, driving in the raids is not picturesque. The old 15-mile-an-hour limit in Alerts had to go—it is 30 now, but very much at the driver's discretion—for it reduced the system to chaos and congestion; the driver knows the dangers. Engines have gone into craters and have somersaulted down embankments; they have been known to take a fallen footbridge on the cab. One driver was going towards Preston during the day-time when his train was machine-gunned and bombed. A train cannot dodge. In his own words:

"Soon after passing Stoke Hammond I heard a rattle of machine-gun fire and I noticed bits of something flying from our train. I warned the fireman and accelerated. Then I shut off steam with the doors closed and blower shut off, so as to throw out a smoke screen, because

the plane started to bomb. Three bombs exploded on my side, 80 feet to the left. The engine rocked. I thought we were on the floor" (i.e. derailed).

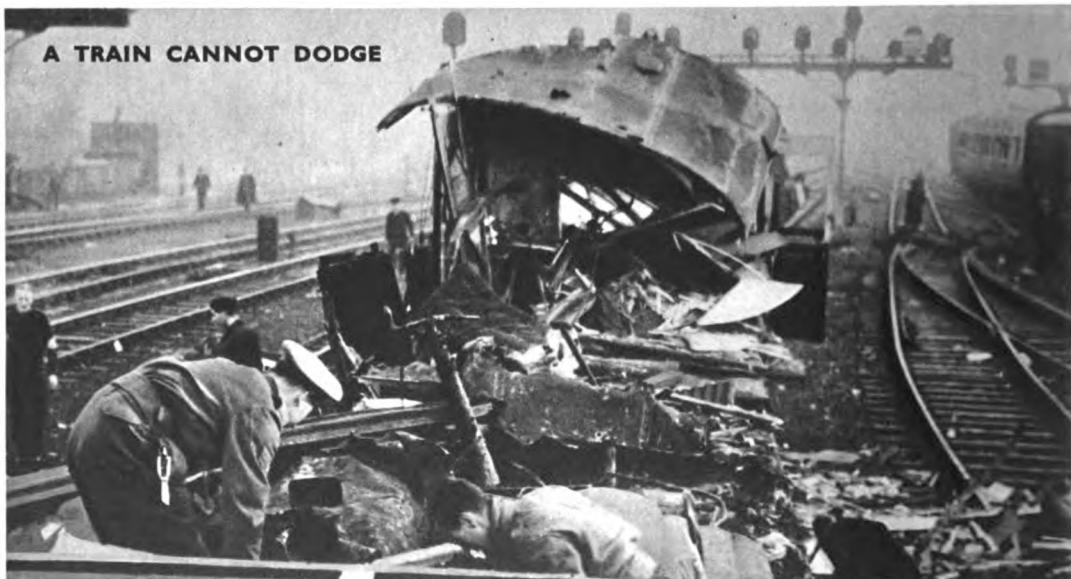
But he was not. He got through.

Another driver drops in with a question for the Brains Trust:

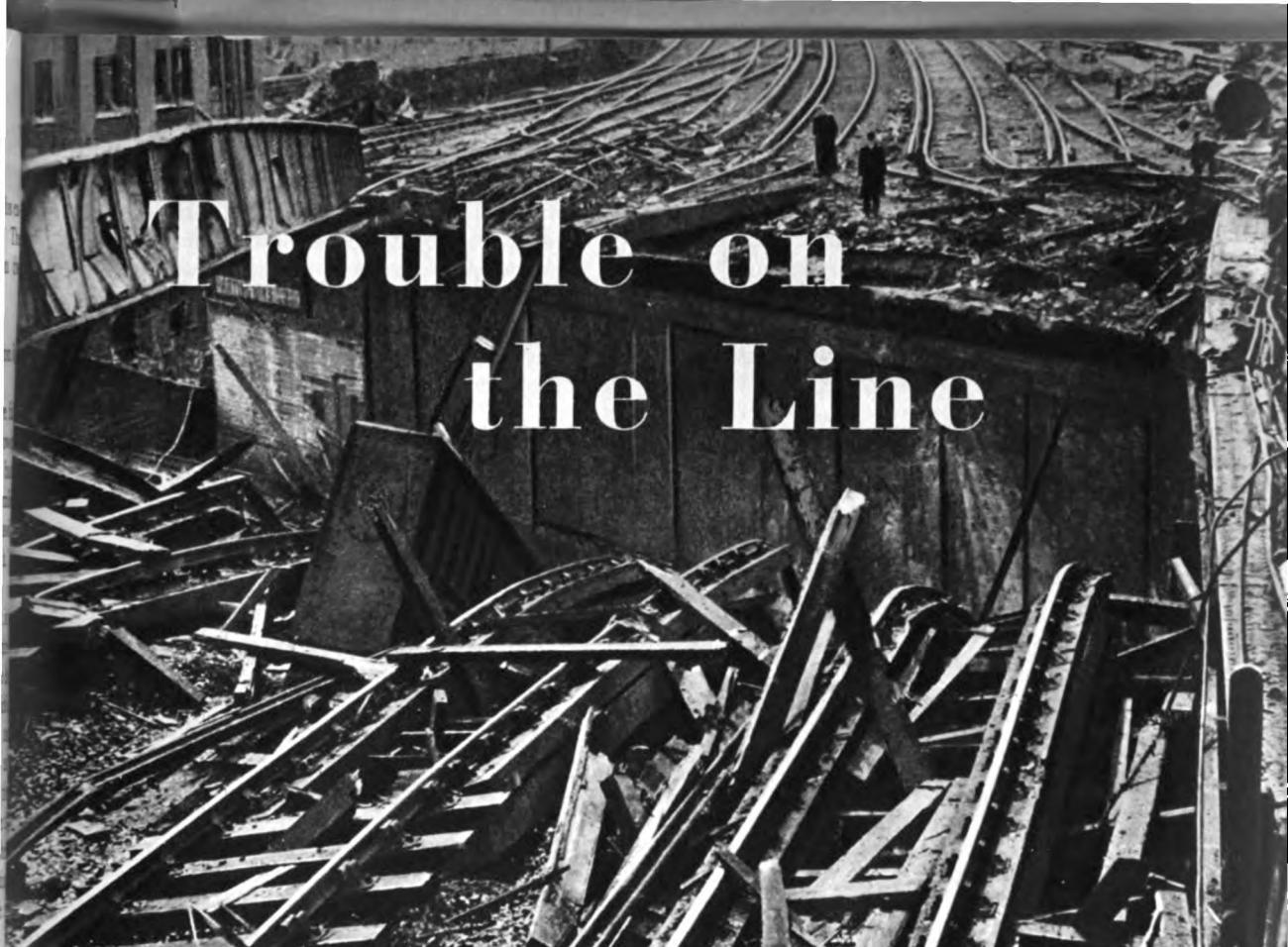
"An hour out of London I saw a flare falling low in the sky. It seemed to be following us. I put on speed to get away from it, but it kept on following. It followed me for 12 miles. I reckon it was the suction of the train drawing it after us. I was glad to see the last of it."

Was it the suction of the train?

The men on the move know what it is to drive out of a place that is being bombed, where they have left their families in the Anderson, or to crawl towards a town which is "copping it", watching for the craters and obstructions, watching that the signals and signal boxes are still there, and all the time with half their mind on the fact that under the fan-like glow of the fires in the city, somewhere their own wives and families are waiting. Their reserve, their sense that they are no different from others, is their strength.



A TRAIN CANNOT DODGE



Trouble on the Line

CHAPTER SEVEN

THE full story of what the railwaymen did during the blitz will be an enormous one when it is written. The awards for gallantry are simply pointers to dozens of courageous acts which are on the records, and these in turn point to hundreds of others. There is something fascinating and odd about these official records. They are so very official to begin with. "Re Enemy Action Such and Such a Date", they begin. You work your way down the opening letters: the Ministry of War Transport congratulates the Company; headquarters congratulates the division; the division is eloquent to the station-master. It all sounds very formal, like a public dinner.

However, not all have the regulation stamp. Take this one headed: "Re Enemy Action Coventry 14-15th November, 1940." It begins misleadingly with a bill from the Nuneaton Co-operative Society for £1 14s. 11d. A peculiar bill: items, 25 lb. cheese, 2 gal. pickles and $\frac{1}{2}$ gal. pickles. On the 15th of November there seems to have been not an air raid but a considerable feed at Coventry. What did they have with the cheese and pickles? Beer? Tea? Who sent down for the extra half-gallon? Turn back the pages of the report. Quite a number of letters were written about that feed. It went into the mouths of the gangs sent down from Rugby, Nuneaton and the Signal Telegraph Office, who were clearing up the mess at Foleshill and Three Spires

after that night. They worked non-stop on the line for eighteen hours.

The picture becomes clearer as you go back through the papers. Up at Crewe they heard the aircraft going over with their monotonous deliberation, and they realised Coventry was in trouble when the Controls reported that there was no telephone communication with that city. The only thing to do was to send someone down into the raid to find out.

This fortunate man was the station-master of the nearest junction, not a young man. You picture him, true to training, putting on his station-master's cap—for railwaymen on duty are, as it were, on parade—and travelling down that unhealthy loop on the footplate of a light engine to find out what had happened. They were soon at the edge of the first crater. What the order of events was after that is not exactly clear. It never is very clear in a raid. You find yourself in the middle of a number of personal narratives dictated to the Inspector and written out in pencil on pieces of exercise paper. Here is the fireman driving into the raid:

"Whilst proceeding towards Coventry on the return 9 o'clock ex Leamington with Driver Blank I heard shouting from an A.R.P.

warden, who had climbed on to the railway line and informed us that a bomb had demolished two houses and he was under the impression that the Main Line had become obstructed."

"Obstructed" turned out to be a mild word for that impression. The driver and fireman decided that they could go on, but with caution, and after a while they saw a red light ahead. It was the tail light of a goods train on the same line. They stopped, and presently they had a new experience. "I then experienced the dropping of High Explosive and Incendiary Bombs." Now bombs are not provided for in the Handbook of Regulations, which is the Bible of railwaymen, but tail lights and a hostile signal are. They are provided for in one of the most sacred and elaborate rules of the profession, a rule so important that many can recite it by heart. It is called Rule 55.

Rule 55 reads like the regulations governing an irregular verb, and has defined every conceivable variety of circumstance in which a train may be held up by a signal. Continuing to experience heavy bombing, the fireman got down from the engine, walked along the line to the signal-box and performed his duty. He

"Then the trouble started. He began to send down incendiaries."



"proceeded to carry out Rule 55". That was the last time Rule 55 was carried out at those signals. A bomb screamed down and blew the signal-box to pieces.

You come then to the final document, the most curious of all. It is a printed card, headed *Staff History*. Underneath are spaces for Name, Grade and Station. Beneath these are the sublime words: "Particulars of Irregularity and Punishment Recommended", and under that are several names. They begin: "Acting Station Foreman, Coventry, commended for Prompt Action during raid on Coventry Nov. 14th-15th...." The aftermath is instructive. How long does it take for a railway to recover from a night like that? Well, Coventry station was closed on Friday and Saturday the 15th and 16th, but they ran trains to Leamington and Birmingham on the Sunday. The bill for cheese and pickles was not excessive.

The determination to run a train, as quickly as possible at all costs, is a point of professional pride. It crops up in all the London termini during the blitz, and when one looks at the Southern's non-stop battles of Waterloo, London Bridge, Cannon St. and Charing Cross, one does not know where to begin. But here is one of their station-masters looking back on the experiences of those nights. We will skip the many stories of despatch riders who kept contact between the stations and controls when the wires were down; and we can do no more than mention the men who sandbagged the time-bombs and drew screens of coal wagons in front of them to take what was coming, if it did come. Let us go on to a few things that happened on the night of April 16th, 1941. After the fire raid on the city, this was one of London's worst.

The station-master is a heavy, grey-haired man, with a grave yet humorous look and a hard hand-grip. Nothing would perturb him, you would say, and after April 16th, nothing could. They were getting out one of their heaviest passenger trains of the evening, when the warning went: the station-master



"Two trains had been on fire at one platform, and more had caught it on the bridge."

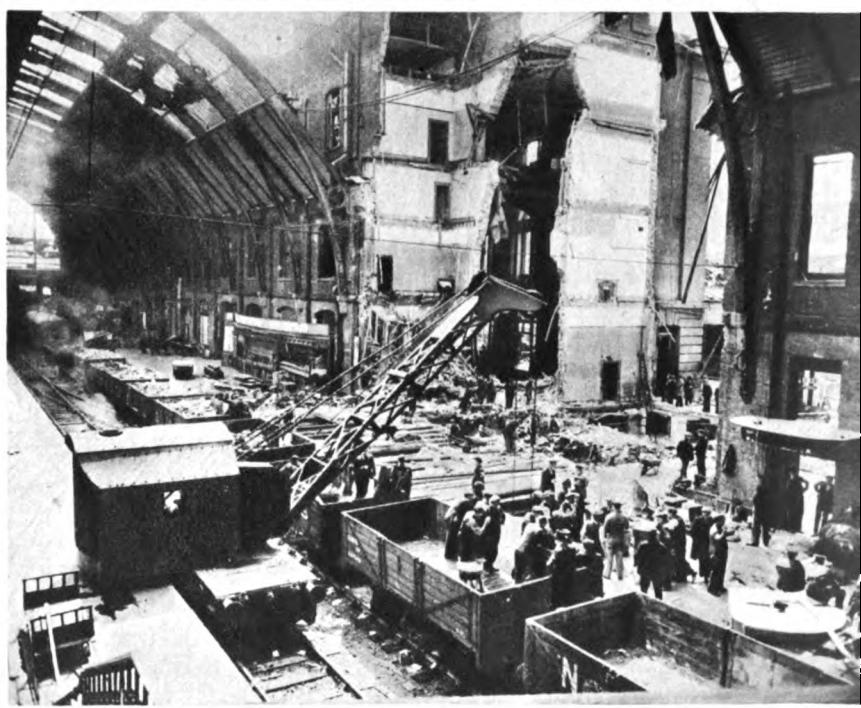
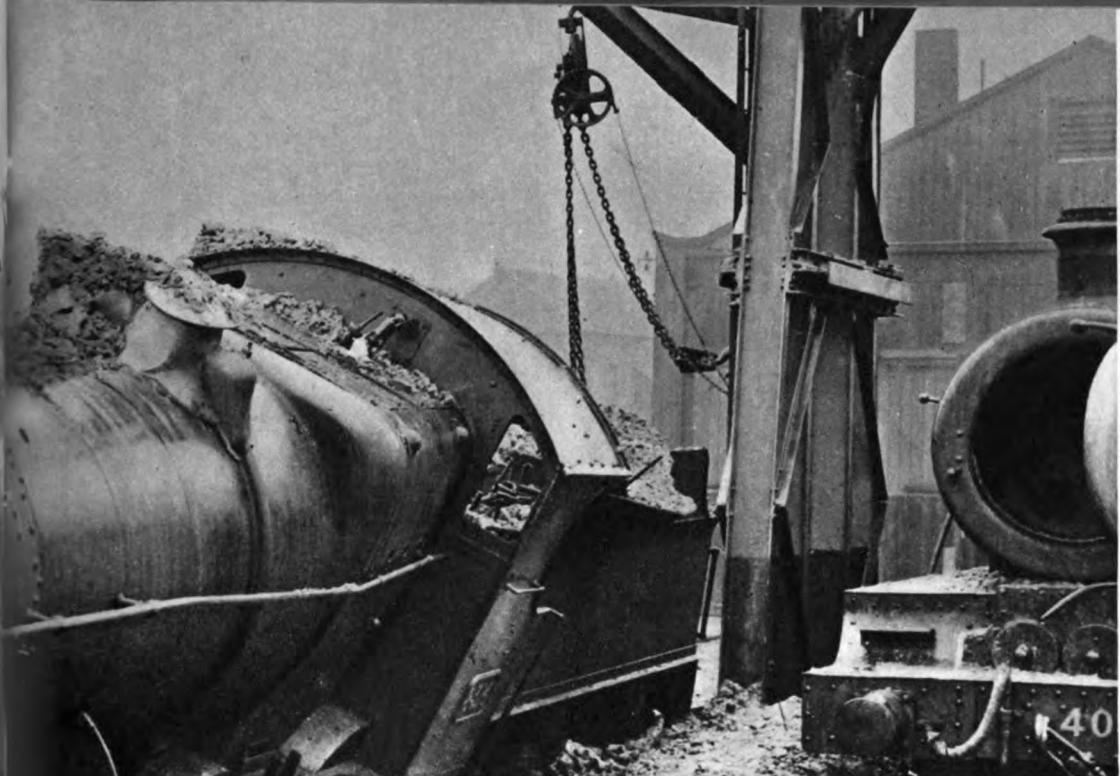
was on the platform talking to the guard.

"I came back at once to the office and before I got there a bomb fell. There was a soldier down below in the hairdresser's and when the warning went he got out of his chair saying, 'I'm going to see whether I can do anything.' He got to the top of the stairs and the bomb blew his head off and killed a porter. They," says the station-master quietly, "were the first dead men I saw."

The raid went on. There is an important signal-box outside the station. The station-



THE BLITZ HIT THE TRAFFIC YARDS . . .



IT HIT THE GREAT STATIONS . . .

master went up to see how the signal-box man was getting on. In a raid the signal-box is about as sheltered as Nelson's column. The signal-box man gave the thumbs-up signal: the station-master went away, not knowing that the man who put his thumbs up was wounded seriously by splinters in the chest and that an old man of 52 years' service was carrying on.

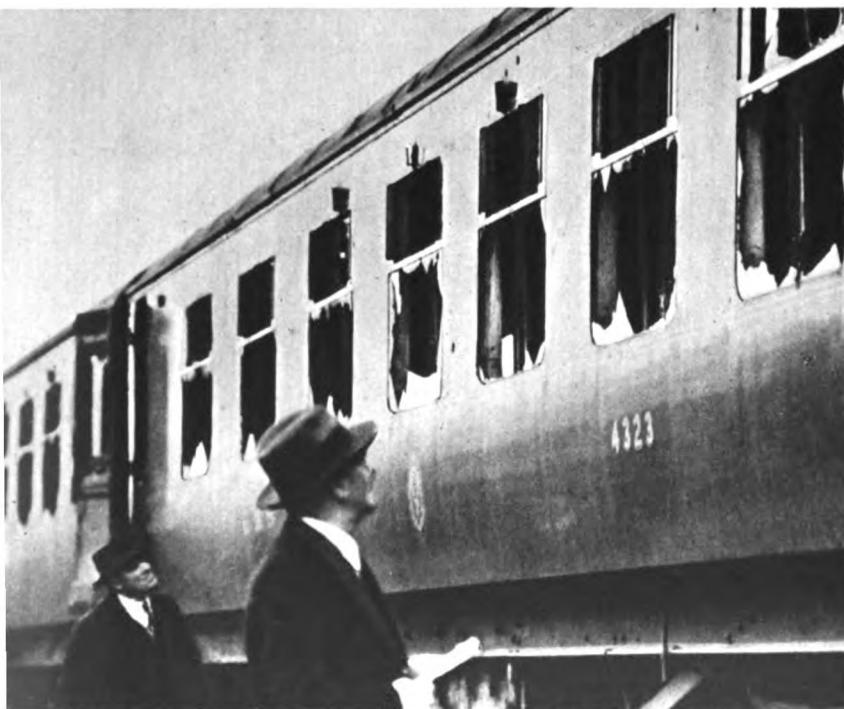
"Well, that's how it went. The stuff was falling thick. At two o'clock—round about two o'clock anyway—the station hotel was hit, as you know; and then, as the saying is, nothing happened for half an hour. But then the trouble started. He began to send down incendiaries. I went out on to the platform. Two trains were on fire at one platform and more had caught it on the bridge; there was a big hole in the permanent way on the station itself, and smoke was pouring out of it; the signal-box steps were on fire, and the two

men inside were climbing down to put them out. Some Canadian soldiers—they wouldn't give their names—were putting out the incendiaries on the trains. I saw one of our men coming off the bridge in the light of the flames, so I went up to meet him. Quite calm he was. 'If you're going on the bridge, sir,' he said, 'take care you don't trip over that time-bomb.' I laughed, didn't take him seriously. 'I'm serious,' he said."

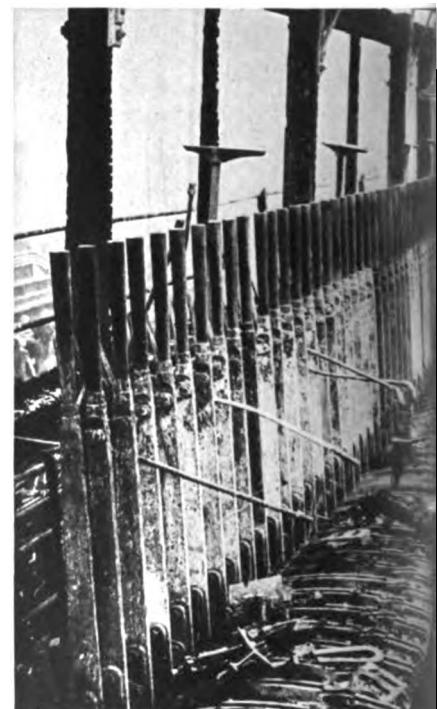
There *was* a time bomb on the bridge. So he gave orders to clear the station and the road outside—a little fussed too, about clearing the road, for the law is the law, and the road did not belong to the railway company—and then waited for the morning, when expert help turned up. . . .

The station-master got through to headquarters.

"'You'll have to close,' they said to me. 'We've cleared one line,' I told them. 'Let me



TRAINS WERE ATTACKED



FIRE BURNT OUT

run one train. Let me run that little local over the bridge.' 'You can't do that,' they said. 'Yes, I could. I'd like to. To keep the station open.' "

He argued and argued with them, until at last they said, "All right. You can run a short one if you like."

"And", says the station-master with a touch of mischief and pride, "we did. We can say now that we didn't close down on April 17th. We ran a short one."

That signalman who had been wounded in the chest died in hospital. He had stuck to the box. Another man who was wounded spent six months in hospital, having operation after operation; he came out and pleaded to be allowed to do light work. He looked fit. They agreed to let him clean the lamps; for a week he was transformed and happy. But he had been through too much. One night he went home, told his wife he thought he'd

go to bed early, and they found him there dead.

Junior members of the staff absorb the traditions of the railway service very quickly, and the official records are full of instances in which youths have behaved with the same coolness and gallantry as men who have grown grey in their Company's service. At Bordesley Junction they will tell you the story of the young G.W.R. engine cleaner who saved the wagons from a blazing shed in one of the earliest raids. The warning sounded at 9.50 p.m. on the night of August 26th, 1940, and shunting operations were suspended. It was soon evident that the railway buildings and the wagons alongside were in danger from a hail of incendiaries, and this eighteen-year-old cleaner, who had less than two years service, went outside and began dealing with the bombs, using his hands and feet to cover them with ballast. He was still tackling the



... SIGNAL-BOXES . . .



TUNNELS WERE BLOCKED . . .

incendiaries when he was approached by an examiner and the depot master's clerk.

"Can you drive a locomotive?" they asked. He told them he could. "Right," they said, "We want someone to take engine 7758 alongside the goods shed and get the wagons clear. What about it?" Without hesitation, the lad volunteered, although by this time the shed was ablaze from end to end and bombs were still falling. Four times he made the journey, with the examiner acting as shunter, and each time he succeeded in drawing a number of wagons to safety. On his first journey he was accompanied on the footplate by the depot master's clerk, but on the remaining trips he went alone. The engine footplate on the offside was too hot for him to touch, but he carried on until the wagons on all three roads next to the shed were clear of the fire. "But for his action," says the official report, "it would not have been possi-

ble to save the wagons from destruction."

Flicking over the pages of these terse official records, you get a series of lightning impressions of the battle that was fought against high explosives and incendiaries in every blitzed station and goods depot throughout the country. You read of the two shunters at Swansea saving a fitting shop from destruction by tackling the flames with buckets of water and rubbing handfuls of sand into the burning woodwork. In the record of the same raid, there is the story of the woman telephone operator at the main railway exchange, who refused to leave her post though the windows had been blown out and the building was rocked by a series of explosions from bombs which were bursting within 30 yards.

In these accounts of brave and ingenious action by the men on the station and the line, one is apt to forget the work that is done in the



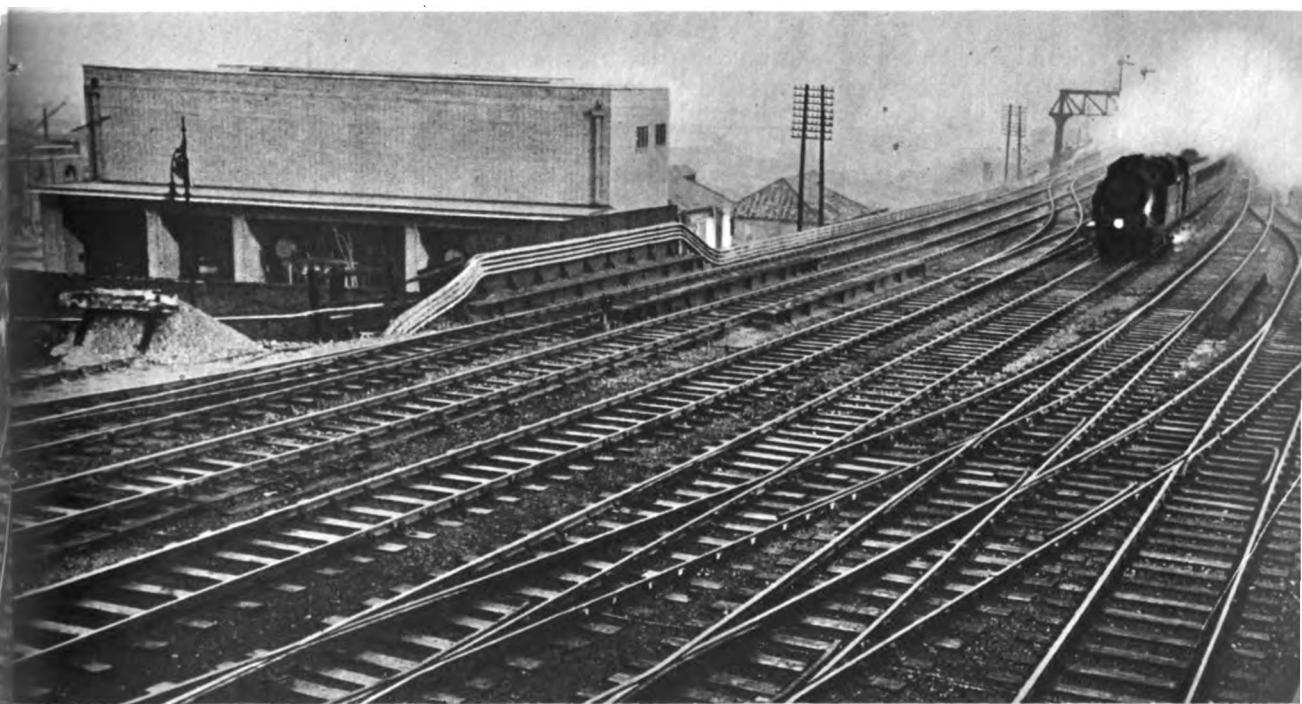
THE LINES WERE CUT . . .

offices of the companies. When one reads the detailed reports of how the railway offices in places like Liverpool, London or Glasgow or Bristol tackled their problems after the air raids, one is amazed at the patience, the cleverness, the resourcefulness and the nervous stamina of ordinary men. Those people in the offices worked day and night. Worked? No, they fought. Fought with pen, typewriter, telephone. They scribbled out their messages and gave them to the despatch riders like men in the front line.

None of the railwaymen who have seen the sheds fired, the trucks burning, the stations closed and the tracks up, is likely to underestimate the mutilation a bomb can do to a railway. But all know that, if the aim was to disorganise our transport system totally, the blitz was a failure. We have seen the human side. What about the material side of the struggle?

The railways were prepared for this blitz and for worse. Each morning a file is put on the area manager's desk telling him of every "incident" that has occurred in his district during the previous 24 hours. These files are beginning to bulge, but when you look at the times you will see over and over again that in six hours, eight hours, twelve hours, most of the services were normal again. This means that the engineering parties were out during the Alert itself, working in the dark or by the light of the searchlights, and sometimes while the bombs were still falling. Despatch riders were taking the messages back when the telephone lines had gone, for shrapnel frequently cuts the wires. Travelling cranes have been waiting under steam, heavy timbers for trestles and girders of every variety are loaded on to wagons waiting to move to the repair of bridges.

The repair work on the Underground in



... BUT STILL THE TRAINS WENT THROUGH

London was often of a spectacular nature. Only about a third of the London Transport track can be repaired at night; and the first difficulties occurred when the inspection gangs went into the tube stations and had nowhere to put their tools and equipment because the platforms were filled with shelterers. On the open tracks, owing to the urgency of keeping the passenger service going in the London area, the repair work had to be done after black-out. The men groped their way to the scene by the light of hand lamps, or often in complete darkness if the raid was on; and there might be no "scene", no "mess", but something far more sinister: the report of an unexploded bomb.

But, if there was a mess, it was anything from a slewed-up track to a pierced tunnel in the Metropolitan Railway with a road crater or ruined building above. A train might have been caught in a station. Girders from the station had fallen on to the last coach; or it might have run into the twisted rails. The gangs and the engineers turned up on a scene of blood and human horror unforgettable in its details, but they had to forget their human emotions, and force themselves on to the technical problems.

At Moorgate, when the old station was burning, they could do nothing till the gutted warehouses, which rise on either side of the line, were shored up; indeed a good deal of London Transport's work was done under the menace of unsafe walls. On some delicate jobs the men worked and slept on the spot, the nightly raid recurring, until the incident was cleared up.

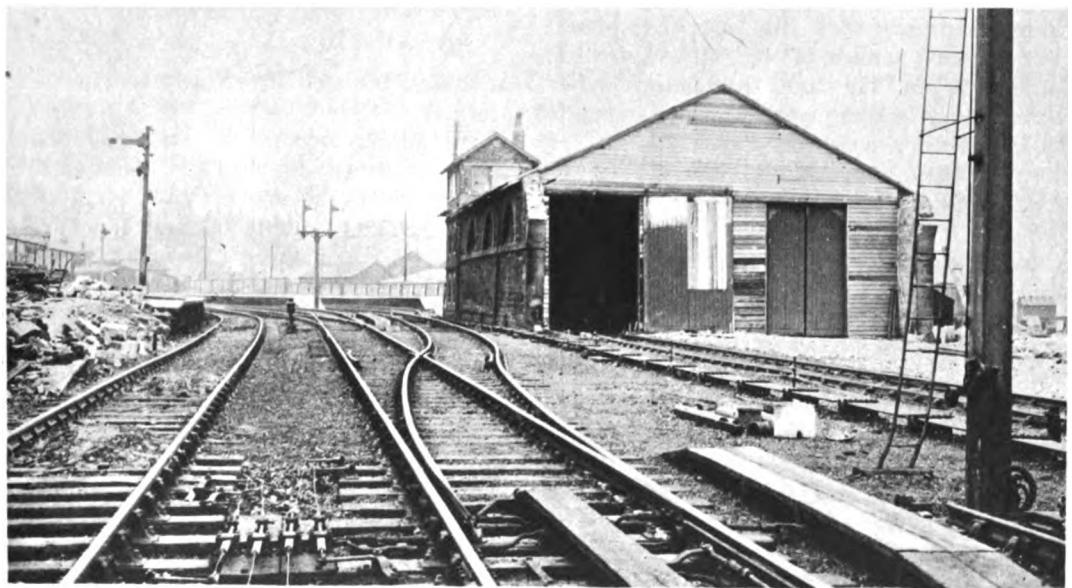
Here is an example of what was done by the engineers with a big mess. One night in north-west London a patrolman on the tracks heard an H.E. scream down and saw it strike the electric conductor rail on a viaduct about a hundred yards off. The blow was a glancing one. The bomb veered off and fell to the soft ground where it went very deep and then exploded. The explosion took a large bite out of the viaduct. The patrolman ran

off down the line—the men know these dangerous rails by heart in the dark—and got on the phone to the engineers. The time was somewhere before midnight. The flying squad came up at once with its equipment. The engineers looked at the mess. There was one slightly encouraging aspect to it; an adjoining viaduct had not been damaged, so the first job was to divert the high tension cable and to get some sort of service going over the other viaduct.

To do this, they constructed a "cross over" on the track 200 feet long, reversed the automatic signalling, and passengers were in fact taken across *the next day*. And as the passengers crossed and re-crossed, the engineers got to work on the injured viaduct. Steel cables were tied to the remains of the arches and a locomotive heaved at them until they fell; then a special train which carries an electric compressor was shunted up and ten heavy pneumatic hammers began smashing down the brickwork. Lorries took the brick away and the men then started to excavate to find a new solid bottom for the bridge.

Where the ground was still weak, they rafted it with steel rails and concrete, a trestle bridge of two spans was built on to this raft, and what is called by the profession "a timber thrust member" was introduced to take the thrust of the undestroyed arches of the viaduct. The construction was now ready once more to take the trains. And it has taken them. Hundreds of thousands of passengers have gone over that bridge since, and all they would notice is that the train slows down a little as it goes over. Look at the result of this operation: trains running the next day on an adjacent, diverted line; the whole job done and full services restored in 14 days.

The repair of viaducts, bridges and tunnels has taken place all over the country; and many of the feats seem spectacular. They are. But they were anticipated. Organisation and material had been placed at key points to deal with these things. Brains have defeated the bomb.



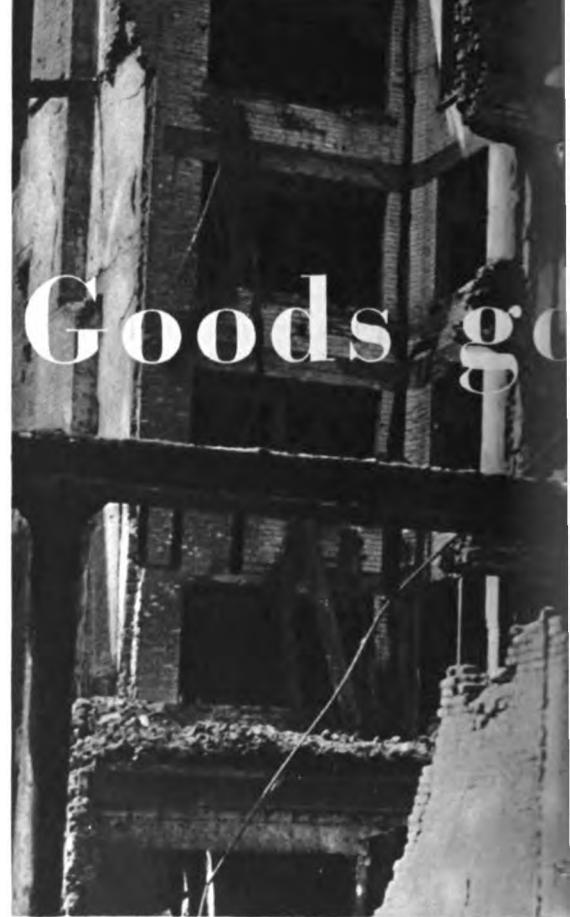
THE RAILWAYMEN HAVE BEATEN THE BLITZ

The Goods go

CHAPTER EIGHT

WHAT is a railway like? It is as intricate as a clock, and the joints, the cogs of the mechanism are human beings. At night, when natural sounds die down, we hear the sound of the trains, the whistling, the shunting, the steam blowing off, the noise of cannonading wagons as if someone had run his hands carelessly over the keys of a piano. But the real sounds of the railway are the human voices. The train that passes us has been sent by voices, is taken on by voices, is the subject of a continual conversation. Not a wheel moves on the lines, but a voice is recording that movement and passing on the news.

Before the last war, the railways had introduced what is called the Control system. The railway is divided into areas, and the movement of traffic is ordered, watched and cajoled (and sworn at) from a number of central points. To-day these places are hidden underground in formidable strong points where no bomb—it is hoped—can penetrate. There, in the heat of the concrete rooms, sit the men who guide the trains, and the telephone girls plugging new telephone calls every few seconds. For twenty-four hours a day these

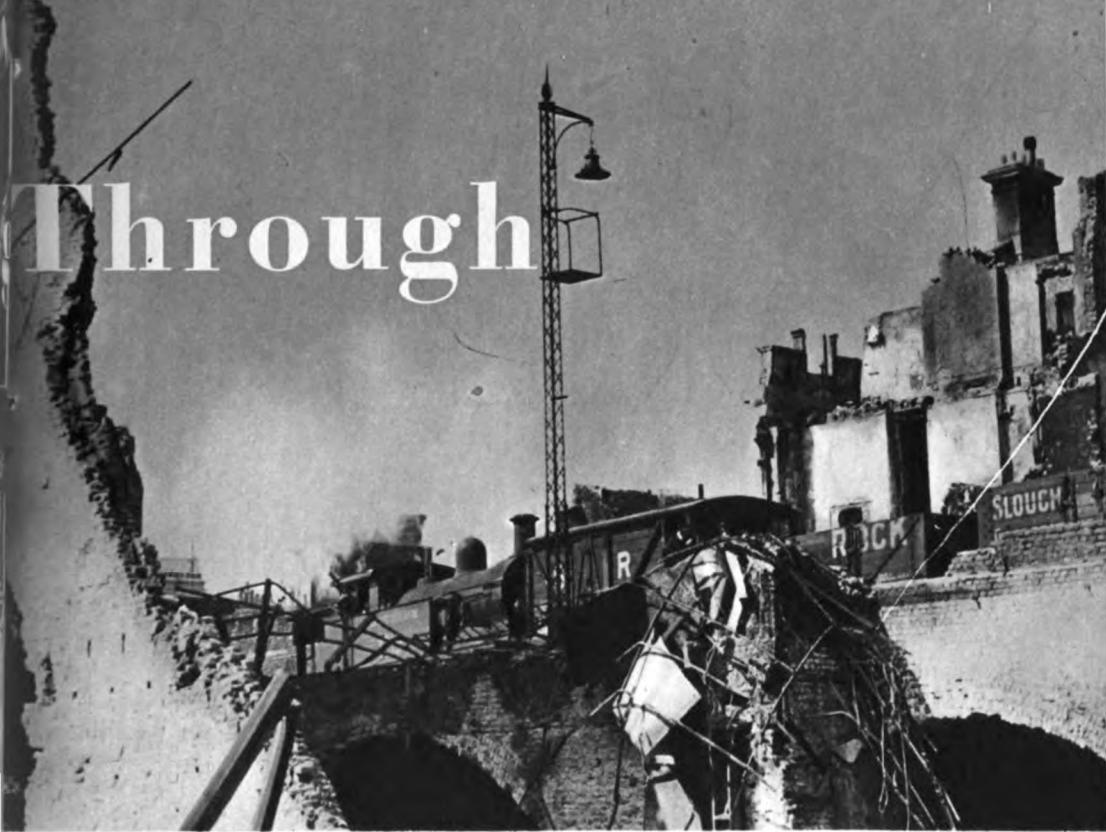


advanced posts of the railway system are at work.

You go into a room where a dozen men sit in their shirt sleeves, with earphones on their heads and graphs on the desks before them, talking, talking, talking for eight hours a day. Once in a while the talk stops for about 20 seconds; then the man takes his ruler, picks out his blue or his brown or his red pencil, and rules a line on the graph—up the graph for the up trains, down the graph for the down trains, horizontally in red when the train is checked at the signals. In an hour or two this graph looks as mysterious and fantastic as the photographs of flak and tracer bullets, which are brought back from the night raids.

For eight hours a day the men who work in the controls do not stop talking. They are

Through



talking to the signal boxes. Plug in and listen.

"Hullo, kid. Modify the language, please. There's a bloke from headquarters listening. Aye. Listen. The one at 26 left at 39. Where's that light engine? Can you get him out? Let him come, then!"

"Hullo. O.K., kid, then let him come down the slow."

That voice dies. A new one comes on whistling a dance tune.

"Hullo, Les, you can turn him out to the main after the express. 2216 is a re-engine for the yard. O.K., kid. I'll have him turned out. I'll let 614890 go straight."

The whistling goes off. There is a clatter on the line. A sort of moan of glum, hopeless anger comes down the wire. A broad and doleful Yorkshire voice says:

"Eech! Hullo! Eech! I'm 4486. I'm the driver. I've been boomed. Aye. I say I've been boomed all morning." ("Bumping" means letting a train crawl from signal to signal. It is better than stopping a train dead. This driver, after an aggravating stretch of "bumping" was finally "checked.") "Aye. Well, if you're going to check us here all day, I'm going to tie her down and go down the village for some grub. I've been here three hours."

Exit, like a dull human explosion. The control frowns at the graph and speaks again.

"Hullo, kid. There's no hope for that driver. Loose him off and send him home. Let 4486 come home late." All this is like listening to an opera. The tenors and the baritones strike in. Occasionally there is a



"TALKING, TALKING, TALKING, for eight hours a day."
Not a wheel moves but a voice controls that movement.

SIGNAL-BO⁰
relaxed, s i

Wagnerian roar on the line ("Those damn fellows working on the line"—and working, one would say with a road drill or a tommy gun), and then the Yorkshire bass booms out, bluntly like a super-policeman:

"Northallerton! That one I boomed passed at 2.52."

"Two-fifty-two," repeats the Control picking up his pencil and ruler.

So the voices go on.

"You know what they'll have to do," says the Control, "and mind you, this is unofficial, so don't put it in. They'll have to cut passenger travel right out three days a week if they want to get this stuff shifted."

Unofficial that certainly is. But, look at the traffic which goes through a certain north-eastern junction in the course of a day. It is not the largest or most important junction in the north. It does not compare with the great marshalling yards. Yet there are 83 miles of sidings there. Most of the goods traffic filters through this place without having to be shunted and marshalled. But the little that is left has to be sorted out according to destinations, and this "little" may amount

to over 6,000 wagons in 24 hours! The traffic is 100 % up on 1929 and 30 % on 1939 and there's a train going by up and down every 13 minutes of the 24 hours. Ten years ago there was a train only every 23 minutes. These are not passenger and goods expresses, the railwayman's dream, but heavy, slow-moving trains, continually stopping.

The Controls are run on various systems, but the same unending opera goes on in all of them. You can see how it is that in wartime these men can't stop talking. The station-announcer giving out her 250 trains a day, telling people to pull down the blinds, and telling Mr. So and So that his wife and children are waiting for him on No. 5 platform where he will hear something to his advantage, is a strong silent woman compared to the Control men.

Considering the babel in the Controls, it is a surprise to find that the signal-boxes, which sounded so vocal, are in fact silent places. The men stand in silence before the long row of levers. They are mostly grey-haired men, with a youngster at the phone, easing himself into the job, and getting the proper air of



SILENT PLACES. The men stand there
watchful, single voices in the babel of the Controls.

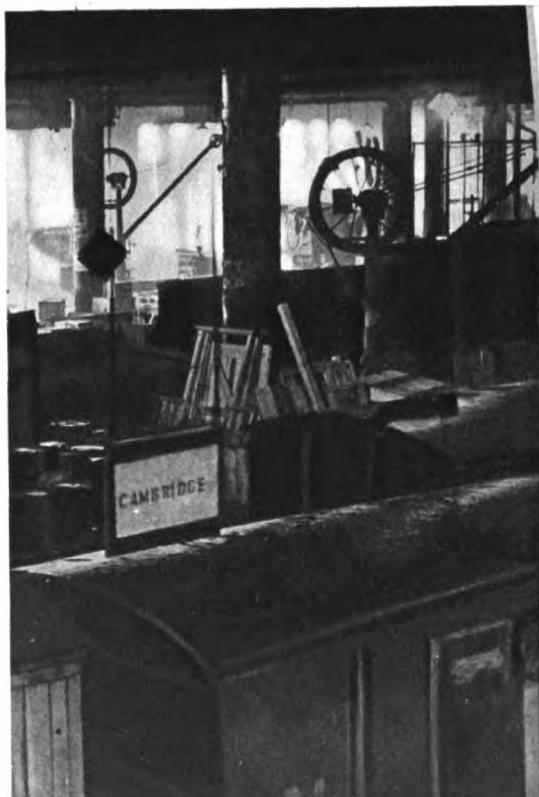
bowed, almost priestly discipline. They stand there relaxed, inert shoulders bowed but dead still and watchful in the smoky railway light.

A bell rings. They take a step forward and both hands go to the lever, trying it first as if to be sure of their grip (but actually testing if it is free, for on the interlocking system, you cannot be sure that your lever will respond), and then they heave. When that lever is over, they move down the row and pull its fellow and there is (to the stranger) something alarming in the random way they seem to pick their number. But casual as the action seems, there is always a perceptible pause of consideration as they step to the place. Then they step back and stand there relaxed and slumped, heads bowed again, waiting until a voice says, something like, "Got that 13?" and once more these peculiar watchers step forward to the long steel row of levers with their red, white and blue markers. The boy there is writing the log. Presently he will go to the signal school to learn the mysteries of the cult on a model railway.

The trains go by. The smoke boils over,

clouding the window of the signal-box. There are six men in that box. The head man is having his mid-morning cup of tea. "How has the war affected you?" you ask. He is a large man, rather proud of his waistline. "Ye can see for yourself," he says, giving a caress to his corporation. But, seriously, he says, it isn't bombs or fire-watching or even Hitler that gets you down. It's the blasted black-out. The black-out is a thing which makes you think of a lot of words beginning with a "b".

By day the signalman sees the train pass. He identifies it. It confirms his decisions. He has only to look from the illuminated graph with its changing lights, from the theory of the thing, so to speak, to the reality.



STEP ACROSS TO THE GOODS STATION,
the station the passenger never sees. War has
brought a huge increase in the traffic handled here.



By night, working under dimmed lights that are virtual darkness and with sacking for a black-out on the windows, he is a different man, as stiff and alert as a listening sentry. At night the signalman gives the impression of someone listening for a pin to drop. He can't *see* the speed of the passing train; can't be sure of its length; isn't certain when it has passed the points. The graph is there above him, but the eye cannot confirm it. He's like a man doing chess in his head.

The great railway stations are places of moods and temperament. One moment they are intense, exciting, hurrying, noisy. You have to shout because of the noise of the steam and the more melodious clank of the engines. In twenty minutes the whole scene has emptied. A station which had six trains in it has none and is like a funnel with two holes of murky sky at either end. The numbers of people have thinned to next to nothing, the bookstalls are deserted, luggage stands about on the platforms, the air is stale and exhausted. There is an atmosphere of aftermath and collapse. If you have seen the 800 cups and saucers piled three high and six deep on the long counter of one of the large junctions, waiting for the siege of soldiers and sailors to charge out of the middle-night trains, you get an idea of the empty moments

of the railway. And while you gaze at that depressing sight—clank-spit, clank-spit, along crawls a goods engine pulling its chain of empties, with their gossiping wheels. This gives to the station, in the dead hours, its final note of desolation.

But step across to the goods station, the station which as a passenger you never see. Platforms again, a bay with the lorries and carts for the town deliveries and the cross-town work, wagons at all the platforms. There is no smoke or steam. The coal and oil smell

IN THE GOODS YARDS, IN THE ENGINE SHED

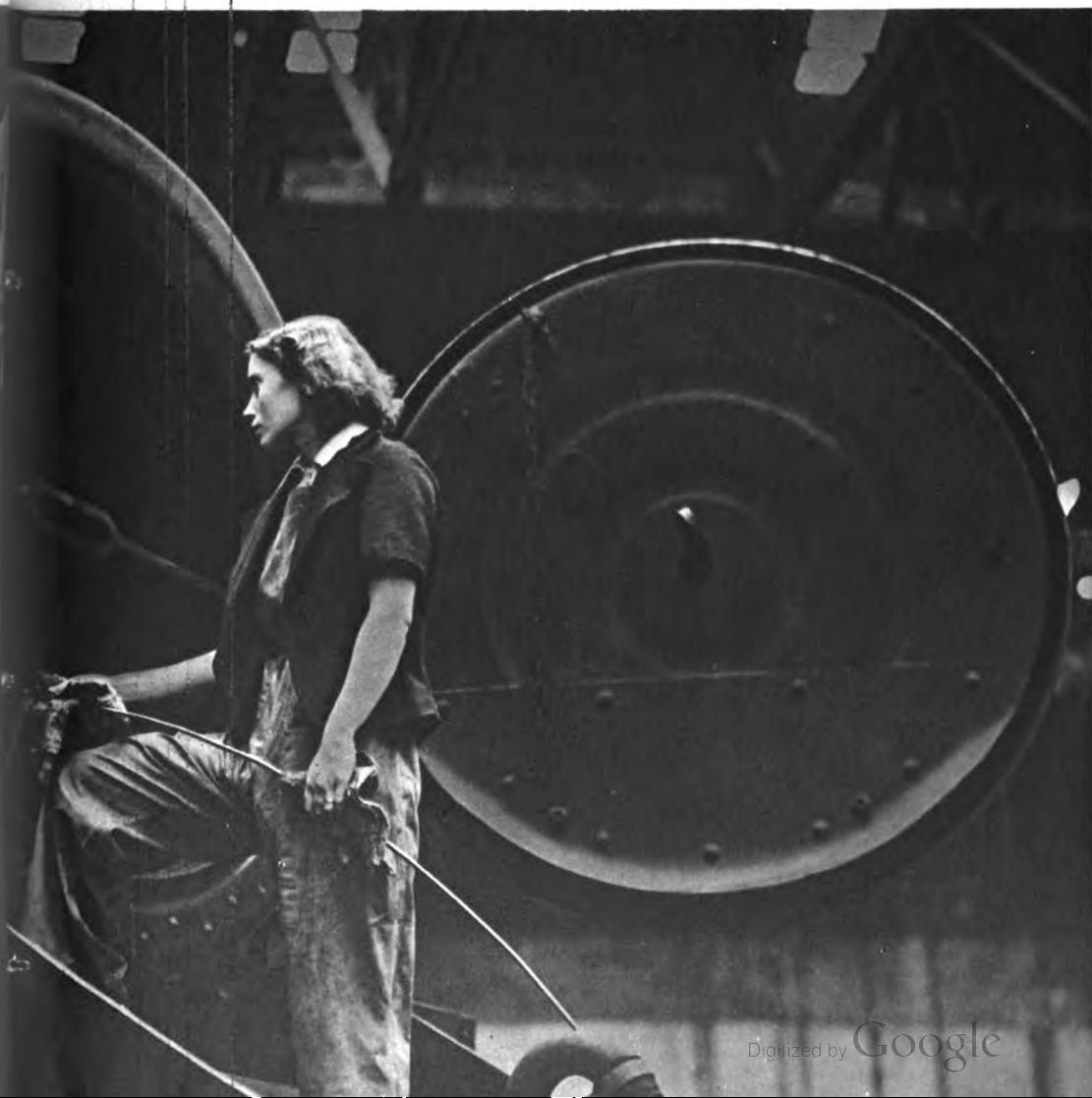


is not there nor the wave of warm air from the buffet. The goods station smells and sounds are different things. To begin with the smell. What is it? It is the warehouse smell. Some infusion of packing case wood, the tang of dunnage, fruit, boot polish, or too much raspberry (from the tins of chemical) or paint and bacon. It smells like the back room of a grocer's or ironmonger's shop.

Then, the place is quieter than the passenger station. There are no engines here. These lines of wagons have been shunted in and the

furious little shunting engine has left them. At the end of each platform is a list of towns, and on signposts all the way up the train are other names of stations. Goods for Oxford go up there, Bristol there, Cirencester there, all kinds of stations you have never heard of—and it is nothing for a company to have a thousand stations on its books—and those wagons are a train due out in a few hours' time and made up in station order. You'll meet that train shunting off a wagon or two somewhere down in the west country.

ON THE TRACKS, IN THE STATIONS, WOMEN ARE DOING MEN'S WORK



The dominating noise is the jaunty sound of the hand trolleys or the rumble of the crane. Scores of girls in dungarees and with very solid shoes are pushing the trolleys from one wagon, up the platform, to a pile of goods waiting to be transferred. There is nothing but the noise of these trolley wheels. At every wagon a gang is working. A gang consists of five people. A checker, a caller-off and three porters. The women are the porters. The checker has a little pulpit with his list clipped to it, by each wagon; he looks too pernickety for a bookmaker, but like someone starting an open-air meeting, perhaps of a religious nature—shall we say The Railway Truth Society—with a small and faithful audience. The caller-off is the man who knows his geography: the geography of England and the changing geography of the trains and the platforms.

Out come the rolls of wire netting, the peculiar parts of military instruments—what are they? Bits of Bren guns? Radiolocation instruments? The nose bands of a Spitfire?—crates of fish, dog biscuits, a set of school desks travelling from Essex to Wiltshire for some evacuated school. Here a girl is taking on too much, trying to tip a heavy packing case on to her lorry; a man spots it, turns round and gives her a hand, silently, and she goes off. No one speaks much. There may be laughter from behind the cases at the end of the train, but on the job there is a preoccupied silence.

The women like this job because they are free to move about and they see new faces. They like the variety of it. It's a job of unpacking the groceries on a large public scale and every day is different.

The war has brought new traffics to the goods yards

In London, owing to the turn-over of traffic to the western ports and the evacuation, the work has been slack sometimes. But the coal trains are heavy. And there are peculiar new traffics. No more Jersey specials with the

spring potatoes, and not the same rush for the market traffic; but on the other hand there is an enormous traffic in empties—empty boxes, cartons and crates which used to be destroyed before the war and turned into firewood, but now are carefully saved, collected and sent back to the senders. The economies in your home may mean a hundred truck-loads of empties a day at a big London yard. Since the war there is a huge increase on the railways in the small package traffic.

That, so to speak, is the birth of a goods train. They go out to their time tables. An engine and guard's van have to be allotted to them. Outside the sheds, there is always a slightly expectant and watchful atmosphere, especially as the black-out approaches, when the 6.20 goods is standing under its plume of steam waiting to go out. In some places it pulls out slowly, without its guard's van, until it draws a few yards past an incline (called a "Kip"); on the kip is a row of guards' vans waiting like taxis. The next guard takes off the brake, and down runs the van on a brief joy ride and comes on to the end of its train, where the young shunter is waiting to couple it.

But the train may not be one of those simple ones with a set of neat destinations in station order. It may be coming from a long distance with traffic for scattered areas. Coming from the north it may have goods for the south, the midlands and the west. Those trains have to go to the marshalling yards. There they are broken up or "cut", and made up into new trains. There are many marshalling yards in England, marshalling yards for goods, marshalling yards also of a different kind for passenger coaches. At the marshalling yards you see shunting elevated to the plane of higher mathematics.

There are, broadly speaking, two kinds of shunting—flat shunting and hump shunting—and serious academic arguments are maintained about their merits. But, whichever school you belong to, shunting for the railwayman is one of the fine and dangerous arts. It is a young man's job. Shunters are the pica-

dors of the industry, who scoot over the points and the wires, prodding and persuading the wagons. Shunting is a 24-hour, all-weather job, a bitter occupation in the winter, for sidings are always shelterless and wind-swept. Before the war the yards were lit by arc lights; but now those lights are reduced in power to a greenish, moony dribble which goes out, of course, when the warnings move from yellow to purple and red.

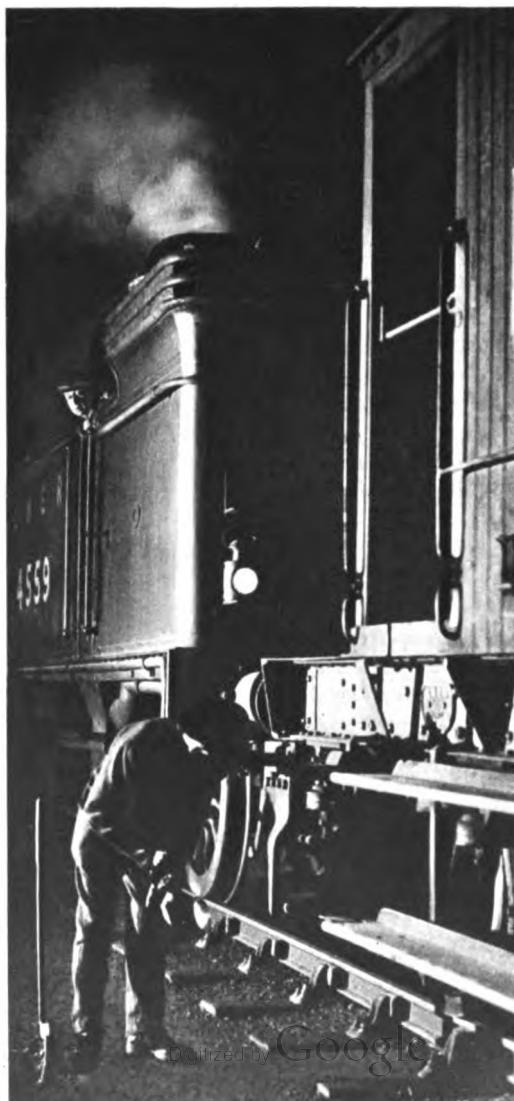
What the young night-shunters hope for most is strong moonlight, a shunter's moon; though some of the old inspectors, who have been shunters in their time, will tell you that moonlight makes shunting more dangerous. The moon throws sharp, deep and misleading shadows which are especially deceitful when they are cast by a moving train. The light strikes through the gaps between the wagons on to the next column moving beside them and gives them a bewildering camouflage. The war-time shunter works by a dimmed hand lamp with just enough light for reading the vital destination card on the wagon, so that he knows where to make his cuts in the train. With it he can also flash his code of signals to the engine and to the man operating the fan of points.

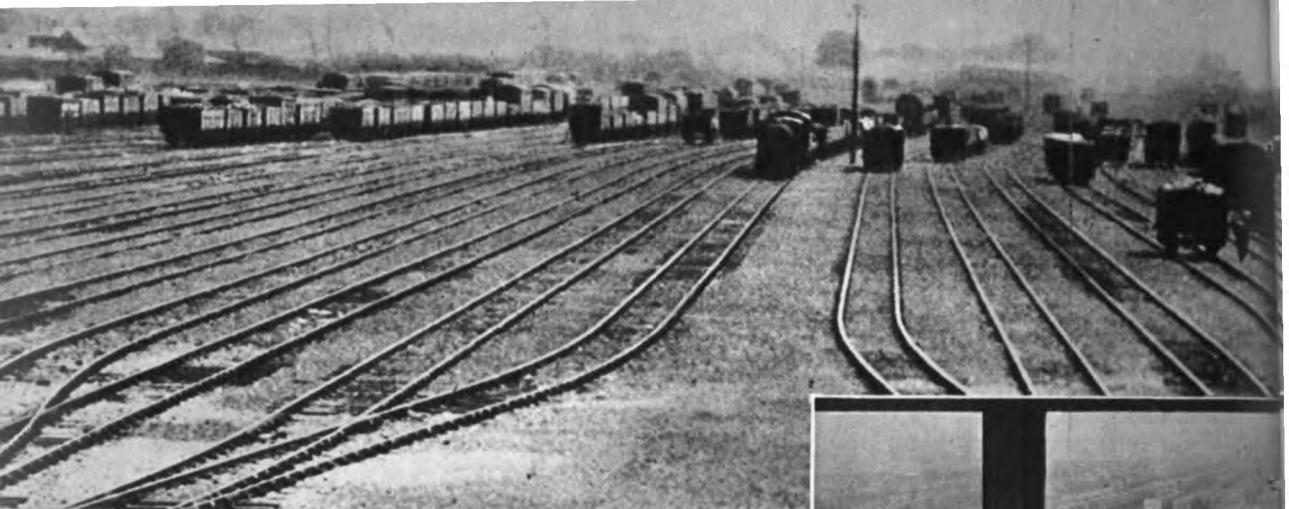
Let us go to Hanum—the English Hamm copied from the German model so often visited, and said to be even larger. This is a "hump yard". It lies in the East Midlands, in one of the coldest and most windy parts of England. You step out over the flints and sleepers of the junction into the usual head-wind and under the usual squally sky, while overhead the Spitfires flash like mayfly.

The plan of the yard is like two pairs of bottles placed neck to neck. At the necks are the famous "humps" or bridges. Beyond them, the lines branch out into the sidings. The engine shunts the uncoupled wagons up the slope to the bridge, and as they pass down the other side, they fall away from the train and race down-hill, each set of wagons to its proper siding, through the operation of a master control.

The secret is in the tower. High above the yard, in a room like the top of a lighthouse, are three or four men. One sits before a chess-board of lights which is a map of the points. He sets those points by means of a "plunger", for the new make-up. The wagons pass and they leave the points changed for the wagon following. Still, it is not quite as easy and as fool-proof as that. Shunting, like tacking in a small boat, is a skilled occupation. The wagons travel down the slope of the "hump" at varying speeds; they may be

THE SHUNTER'S WORK GOES
ON, all day, all night, in all weathers.





running into sidings which are empty or nearly full. Single wagons skip down at one speed, doubles and threes at another. Loaded wagons are faster than unloaded wagons. You cannot let a full wagon of coal charge down into a full siding and cannon the column in a head-on crash. You can't let cattle go down the racer. And "cripples" (damaged wagons) need gentle handling.

There is a man in the tower who has got to judge these things as he stands at the window, ignoring the monotonous beauty of the landscape. He is operating a machine called the "retarder", which works a braking table over which the wagons run after they have come down the "hump". The man who has set the points watches the lights; he speaks on a phone which amplifies his voice over the yard.

A marshalling yard is a place of peculiar cackling and flighty noises, a monotonous ripple of wheels. Everywhere you look you see wagons flying along on their own in apparent disorder and skittish abandon. After an hour or so in the tower, which at night is lit dimly by the light of the instruments, you wish the antics would pause. So does the electrician on the floor below, where the electric mechanism stands in its case. "An electrician's dream," you say as you look at those scores of coils and levers. "Nightmare's more like it," he replies. But marshalling is a 24-hour



EIGHT THOUSAND WAGONS A DAY is the yard; the wagons fall away down the "hump," each

job. They can distribute a whole train in seven minutes! They have a record of 8,000 wagons a day; and in one six-hour stretch, they dealt with 29 trains of 1,650 wagons. And there is little falling off in the night shift, from 10 p.m. to 6 a.m.

"Waiting for the Peterboro."

"Cut out the Manningtrees."

The railway voices go on. The wagons of sugar-beet go north to the factories, the coal comes past, the long wagons of steel and timber take their places. And as you stumble back after miles of walking over the flints, the



ord at this great marshalling yard. It is a "hump" its proper siding. The secret is in the tower.

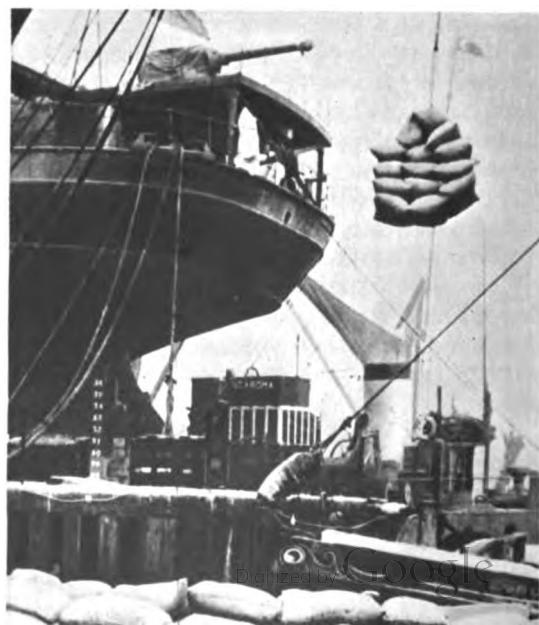
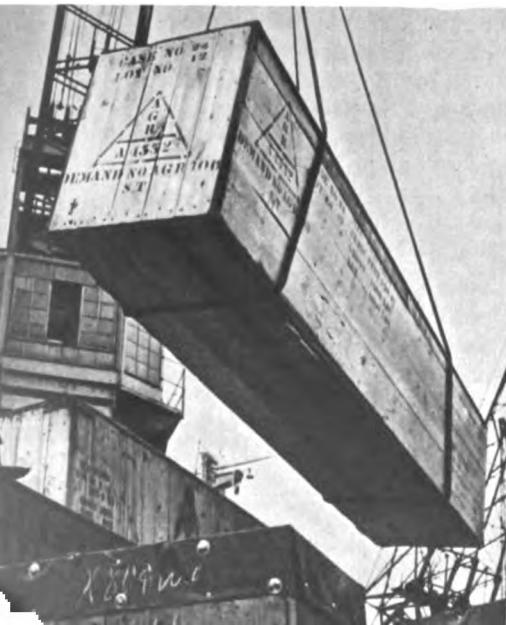
darkness comes down; the lights of the flat shunters in the junction yard are signalling; the novice wonders, as he follows his guide, whether that engine over there is going to come down at him, and how he is going to stand between these rows of moving trucks and not trip over the point arm or the signal wires in the dark. "Keep close to me," says the yard manager in the blackness. "No cripples on twenty," comes a voice from a hut where, in almost complete darkness, an inspector is catching the signals and setting the points on the flat. Nearby stands the six-o'clock goods with steam up, about to move on to the main line.

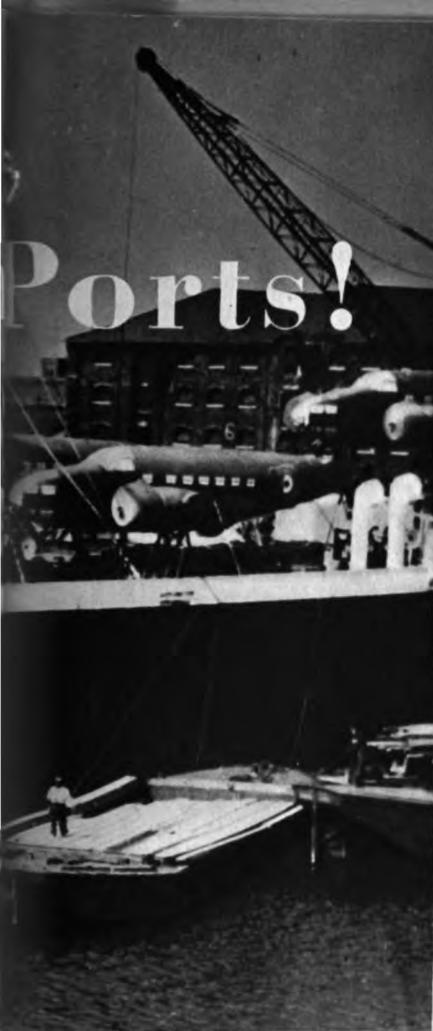
To you it seems chaotic, dangerous, very clever and damnably cold. And half an hour later, when the warning goes and the station lights go out, you think of those not very talkative men among the rails, on the "hump," in the "hump" towers, "carrying on." Not only there, but all over the peculiar places of the British railways. In the smoky locomotive sheds where the engines stand facing each other round the turntables, while the greasers walk about with their oil cans and the women sweep up the litter, and all those engines looking as though, for two pins, they would converge upon you in some mood of preposterous mechanical sportiveness. In the coach sheds where the steam is being passed into the pipes that keep you warm in the compartment—the railways can't afford to have burst pipes. On the mechanical coaling towers. In the stone passages where the drivers come to look at the charts for their engine numbers and the trains they are taking for the day, and where the bowler-hatted managers, with the tough air of boxers' seconds, are dealing with some impossible last-minute demand for engines. In the goods shed with half its roof blown off, and on the permanent way where the night patrols are out. In all the peculiar places of the British railway system, the men are carrying on with more than ever before to carry and less and less to carry it with.

Clear the



THE SHIPS COME IN: AIRCRAFT FROM CALIFORNIA, MACHINERY FROM CINCINNATI, GRAIN FROM





NADA, MEAT FROM THE ARGENTINE



Turn the Ships!

CHAPTER NINE

THE convoy has arrived. Through the mist come the sounds of the horns, the whimper of the buoys, the siren blast as it slides up the river. For a second or two you see the crew leaning on the rail looking astonished at the sight of the port. It is a moving sight—that set of half a dozen smudged faces and greasy singlets. They seem all the braver for coming into port disguised, one can't help thinking, like some comic paper-hanging act out of the halls, with the size still smeared on their slacks. The fairness of the smile, so expansive, cocky, tough, and with a touch of shyness in it, is dramatic. It is the endearing human thing breaking through the glumness of the war. No one moves and no one whistles. The reception is indeed silent and, like many English dramas, falls flat. You rather gather the impression that people are thinking, "Well it can't be as bad as the papers make out; they got back." Or, "Look at that lot. I thought they were dead." But it doesn't feel flat. What men on the dockside actually say, when you catch them unprepared and force them to betray what is in their minds, is "You

can't let those boys down." Even that remark comes out sulkily; the sense of the heroic in England is always damped down—as if the damp climate had something to do with it—by the overpowering sense of necessity.

What is in these ships? There may be hundreds of tons of bacon or butter, thousands of cases of eggs, tinned foods and meat. Or there may be 5,000 tons of steel and pig iron, wheat in bags and bulk, general cargoes of cotton, paper, steel billets. From the docker's point of view, they represent a wide variety of jobs dirty and clean, awkward and straightforward, profitable and not-so-profitable. Before the war he could, to some extent, pick and choose. To-day he takes the rough with the smooth.

But arrival at the port is only an incident in the story of a freight. To every port there is a front door and a back door, and what comes in one way quickly goes out the other. Those in charge of the port must do two things. Load and unload quickly, so that each ship is turned round without loss of time. Move the goods quickly through the port so that they do not remain a tempting target for the enemy. Planned speed is the keynote of port administration. Co-ordination of transport, which has developed to such lengths in this war, is nowhere more visible than in the ports.

Long before our convoy has arrived, its progress has been watched and mapped. The contents of each ship have been listed, the order of loading tabled and the destination of each consignment noted. Ships have been directed to ports that were free to take them without congestion, that could handle them quickly and that are nearest for the destination of their cargoes. The Regional Port Director, through the Port Emergency Committees, has been in touch with consignees—usually Government Departments—and has made arrangements for dock labour and planned the dispatch of goods by the most suitable form of transport available.

In the eyes of that most independent of men, the docker, with his traditions of casual labour,

this spectacle of the Civil Servant working hand-in-glove with the port executive must seem an unholy alliance; but the docker himself is in it, too. He's casual no more. He too has changed and works guaranteed turns on a weekly wage. All are inclined to boast of the time-honoured regulations they have broken with the awed air of people who have broken all the ten commandments at once. And there is reason to boast. They have knocked days off the turn-round time of ships and they haven't finished yet.

The docker to-day is putting in longer hours of hard physical toil than ever before. He is also confronted with what is, for most of dockland, an entirely new problem—the problem of getting to and from his job. Before the



blitz, the docker usually lived within walking distance of the sheds; if he wished, he could slip home for a meal between his work. But bombs aimed at the docks have destroyed or wrecked his home and caused the evacuation of his family and his salvaged belongings to outlying districts. He has accepted with good heart the inconveniences, but he has protested, with true dockers' eloquence, against the lack of adequate canteens. And his protest has prevailed.

It cannot be denied that there is a linguistic side to turning the ships round as well as a silent determined side. The former comes out in the black-out, when delicate and sometimes dangerous operations have to be carried out in semi-darkness, or when there is a par-

ticularly dirty job on hand. It used to come out also in one of the dock labour exchanges. Then one day women clerks were seen at the public counter instead of men. From that day, we are assured, the dockers' language and the dockers' manners have been irreproachable.

As a class, dock workers have probably suffered more from enemy bombing than any other section of the civil community. It was at shipping and ports, remember, that the enemy struck first. And it was against the ports, too, that he launched many of his most savage attacks. The first blows fell on the channel ports—Portsmouth, Dover, Weymouth. Later they fell with redoubled force on the big commercial ports—London, South-

DOCKS WERE THE FIRST TARGET OF ENEMY BOMBING

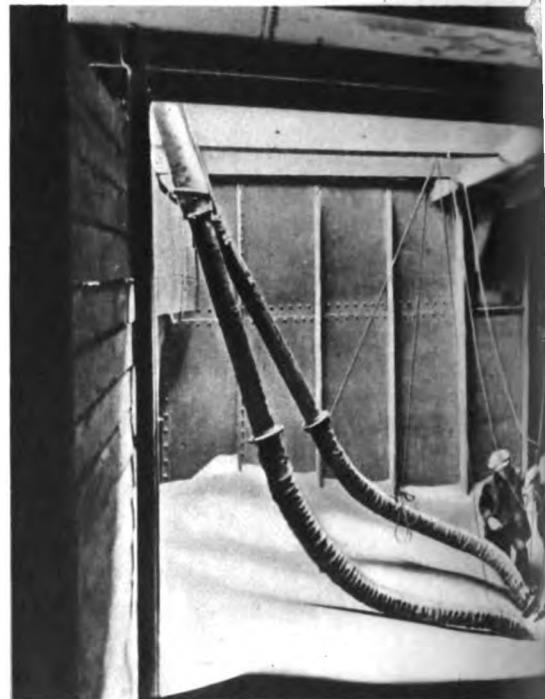


ampton, Bristol, Liverpool, Belfast, Glasgow, Hull. Through all those days and nights, dock workers remained at hand ready to carry on the moment they were needed. They heard the roar of falling masonry and iron girders, the crackle of the flames and sometimes, above the crunch of the bombs and the frenzied banging of the guns, a more ominous sound as a ship's magazine went up alongside the berth, scattering parts of the ship over a wide area. They saw their homes in the neighbourhood of the docks reduced to rubble.

Dock workers took a practical view of the situation. They knew, if the docks went up in flames, thousands of tons of imports went up too. They knew that seamen had risked their lives to deliver these goods and their sense of kinship with the men of the Merchant Navy is strong. Those who had enrolled for Civil Defence duties, and many who had not, joined with the fire-fighting services in saving ships and sheds and cargoes.

For these men and for the population of any one of our big ports, the cry to "clear the docks" has a depth of meaning which the countryman can only dimly understand. Here, in the ports, every street and every village for miles around, has someone at sea. They know the cost, in nerves and lives, of bringing these goods across. To see them go up in smoke on the quays is sickening to the seamen and hateful to the port.

Here is a ship unloading—one of the banana boats that no longer brings bananas. She is lucky. She can unload right on to the quay, the lorries can drive alongside. Looking 40 feet down into the hold, you see the docker crawling over the cases and barrels, pulling them out with his hand-hook, the tool of his trade. The slings come down, the winches hiss and rattle, and then the load swings up and over. There is a travelling crane on three wheels on the quay, with a man sitting in it as if it were a sort of invalid's chair which can be swivelled in any direction at a touch of his lever. It scoots up to the back of a lorry, drops its load aboard and then scoots back.



It is a frantic, powerful, busy little beast and the sad-looking man sitting in the chair with his hand on the levers is an expert in swinging those loads to the right angle and height. An unskilled man would knock the heads off the gangs with the swinging loads.

The loaded lorries stream through the dock gates on to the greasy cobbles, the railway wagons move up on the first afternoon shunt, the little dock engines hiss and spit, the barges swing alongside. Inland transport has taken over.

And the ships are loading, too. Guns, tanks, aeroplanes, ammunition, medical equipment, general stores. There is no hurry, no fuss, but every ship has an appointment which must be kept. Port and transport officials together with the Service Departments time things to a nicety. At Liverpool and also to a lesser extent in the other ports, no consignment is called forward for loading until the quays are



LOOK DOWN INTO THE HOLD. Dockers fix the pipes which suck grain ashore, pull out the cases with hand-hooks—the tool of their trade



cleared and the ship is ready for its reception. Then the pent up traffic is released and pours into the docks, in a well regulated flow, some of it by road, some by rail, the remainder part way, at least, by water.

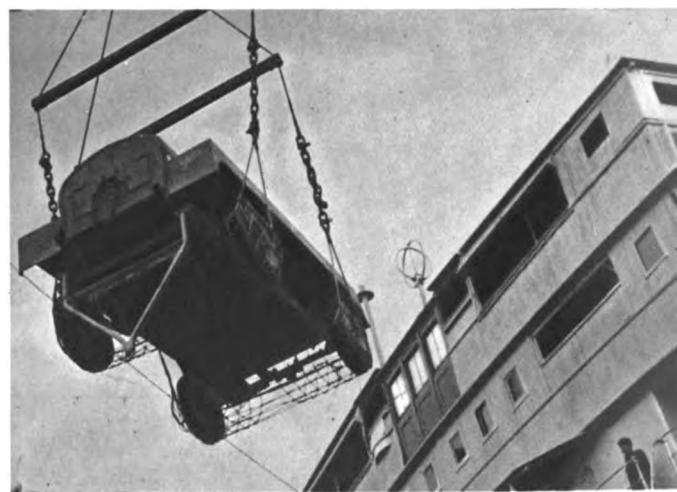
A ship's officer, with wrinkled brow and agitated voice, is awaiting the arrival of some vital piece of equipment without which his ship cannot sail. It may be a regulation raft or a fire-fighting appliance. Whatever it is, he need not worry. The forwarding company know his predicament and that particular consignment is being brought forward under special control as fast as the railways can deliver it. Advance notice of the consignment is flashed down the line from point to point. Its progress is checked at every stage until it is delivered safely at the docks. The ship will sail on time.

The dockers have put forward a special effort and now, the last hatch covered and the last plane secured, the men are streaming out of the sheds to the dock estate bus. Another consignment has been dispatched; another blow for freedom struck. Weeks later they will read that British tanks, or British planes, have been in action on some distant battle front and they will decide that, however hard the going, the effort was well worth while.

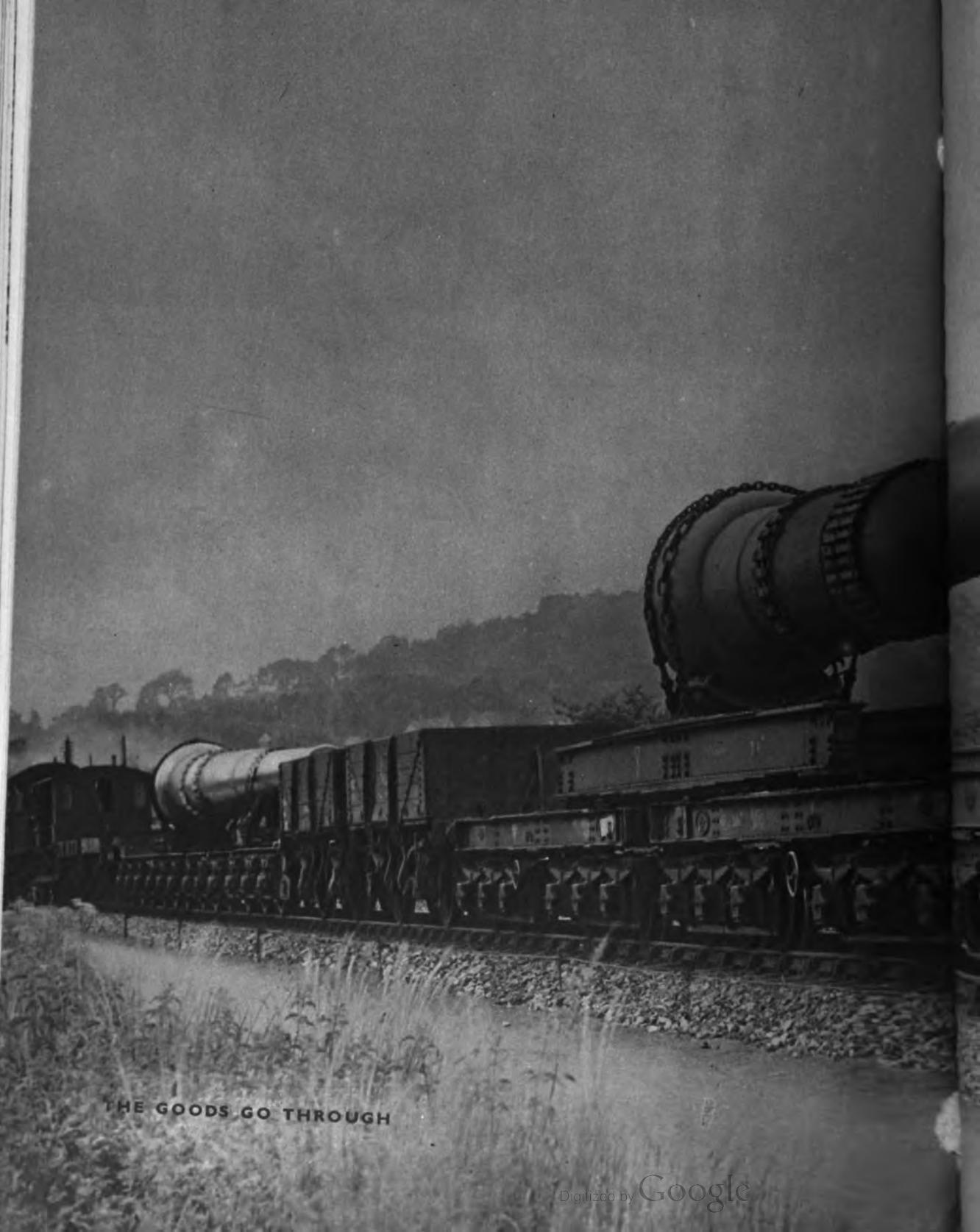
This determination not to let the fighting men down is the driving force behind the whole transport industry. It is the sole aim and purpose of every workers' transport service, every haul of coal, every troop movement. Transport is *at War*. If more wagons, more lorries are wanted, other traffic must give way to provide them. If more locomotives are needed for freight working, passenger services must be cut. If there are too many passengers for the trains, restaurant cars and sleeping coaches must go. Speed the turn-round, cut the waste, improvise all along the line. These are the principles that govern transport policy, and these are the means by which transport men are keeping faith with the men of the Merchant Navy and the Fighting Forces.



THE SHIPS GO OUT: TANKS FOR RUSSIAHIN

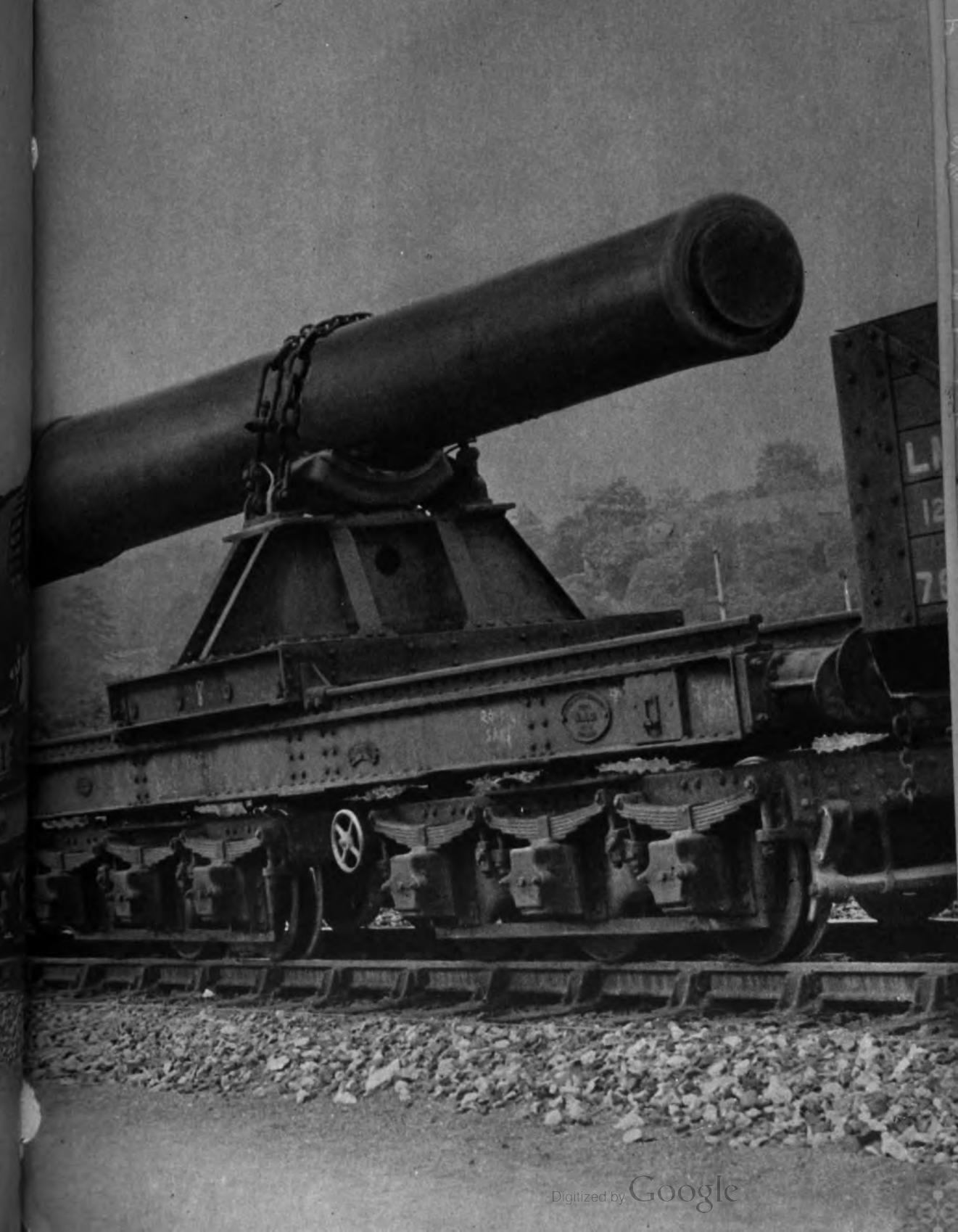


CHINERY FOR U.S.A., EQUIPMENT FOR THE TROOPS



THE GOODS GO THROUGH

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